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ABSTRACT

This sourcebook, prepared by the Intercampus Group on Collaborative Learning of Indiana University, offers suggestions to those who are already familiar with collaborative learning, but want to know how others are responding to the same or similar challenges. Papers are presented that examine general issues of collaborative learning in the Arts and Sciences as well as examples of its implementation. Papers and their authors include the following: "Collaborative Learning in the Arts and Sciences" (Sharon Hamilton); "Fears, Issues, and Concerns about Collaborative Learning" (Avon Crismore); "Creating a Classroom Community: Some Skills and Opening Moves" (Sharon Hamilton, Kris Bosworth); "Collaborative Learning: Building a Community of Writers" (Sharon Hamilton); "Educating Collaborative Teachers: A Report of Faculty Resources" (Alison Carr, Kris Bosworth); "Collaborative Learning and Evaluation" (Kathy Egawa); "The Role of Media and Technology for Collaborative Learning" (Edmund Hansen, William Frederick); "Exemplars of Collaborative Learning in Biology" (Paul Zell, George Malacinski); "Collaborative Learning is Possible in Large Courses" (Kathleen A. Kleiner); "Collaborative Learning in Introductory Biology" (Richard O. McCracken); "Collaborative Learning in an Upper Division Microbiology Course" and "Collaborative Learning in a Graduate-Level Biology Class" (Deborah Ross); "The Flowering of Collaboration by Changing the Structure of a Physics Course" (Bennet B. Brabson); "An Application of Collaborative Learning in a Course on Urban Economics" (Donald A. Coffin); "Collaborative Research Teams" (Linda Haas); "Using Collaborative Learning on Case Studies to Foster Critical Reading, Writing, and Thinking" (Sharon L. Pugh); "Collaborative Learning in a Technical Writing Class" (Julie A. Held); "Writing and Grading Group Essays" and "Students Edit Movies to Demonstrate Examples of Clinical Diagnosis" (John F. Kremer); "Intellectual Community Via Telecommunications" (Helen J. Schwartz); "Collaborative Learning Via Study Groups and the Electronic Classroom" (Robert Althauser); and "Collaborative Learning in an Electronic Classroom" (Daniel R. Sharpless). References follow papers. (GLR)

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LEARNING

Sourcebook for Collaborative Learning in the Arts and Sciences at Indiana University

Edited by
Sharon J. Hamilton and Edmund Hansen

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COLLABORATIVE LEARNING IN THE ARTS AND SCIENCES

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Introduction

Welcome to the sourcebook for collaborative learning in the arts and sciences, prepared by the Intercampus Group on Collaborative Learning. We hope that this sourcebook will offer helpful suggestions to those of you who are already familiar with collaborative learning, but want to know how others are responding to the same or similar challenges that you and your students confront. We also hope that the sourcebook will reach out to those of you who are not conversant with the rationale, history, issues, and procedures of collaboratve learning. This introduction will present several questions frequently asked about collaborative learning and will **begin** to respond to these questions. The intention is to open up avenues of inquiry that will be explored in greater depth in subsequent sections.

Collaborative Learning: What Is It?

Collaborative learning, as it will be used in this sourcebook, refers to students working together to make discipline-specific concepts more meaningful. Depending upon the discipline, collaborative learning may involve problem solving, experimental design, diagnosis and prescription, creating a literary work (either together as a group or individually within a group), constructing a building, planning a team play, or any of an almost infinite variety of activities. The most significant factors are as follows:

(1) working together results in greater understanding than would likely have occurred had the students worked independently;
(2) spoken and written interactions, or interactions involving any semiotic system of signs, contribute to this increased understanding;
(3) opportunity exists for students to become aware, through their classroom experiences, of relationships between social interactions and increased understanding;
(4) at least some elements of this increased understanding are idiosyncratic and unpredictable, consequences of the interactions of individuals with differing backgrounds, motivations, and educational experiences working together on the same or similar intellectual challenges.

Where did it come from?

According to Kenneth Bruffee's "Collaborative Learning and the 'Conversation of Mankind'" (College English, 46:7, 635-652), the term "collaborative learning" first entered scholarly journals in Britain in the late 50's. Biologist M.L.J Abercrombie, conducting research in post-graduate medical education, asked a group of medical students, instead of each providing individual diagnoses as was the custom, to "examine the patient together, discuss the case as a group, and arrive

at a consensus, a single diagnosis that they could all agree to" (Bruffee, 637). What she learned, as she conducted this seemingly slight but portentously significant intervention, was that "**students learning diagnosis this way acquired good medical judgment faster than individuals working alone**" (my emphsis) (637). Her research discoveries were soon taken over by British secondary school teachers who, after the demise of the old 11+ examination that had apportioned students into grammar schools and vocational schools, faced in the new comprehensive schools students with widely divergent backgrounds, motivations, interests, and expectations.

In the United States, the roots of collaborative learning in higher education lie in a practical, almost desperate response, during the 70's, to the needs of increasing numbers of college students unable or unwilling to adapt to traditional college classroom conventions. Peer tutoring, where students help each other with coursework, offered a way to enable students to learn course content while changing the social context in which it was learned. During the past twenty years of its use primarily as a pedagogical strategy, however, educators and educational researchers have begun to realize that changing the social context of learning in effect changes the content of what is learned. In an extension of McLuhan's "the medium is the message," educators and their students using peer tutoring began to experience the power of the social construction of knowledge, the power of "shaping meaning at the point of shared utterances" (to somewhat distort Britton's seminal concept of making personal meaning through talking and writing). The epistemological implications of the concept that knowledge is a social construct rather than an empirical block of transmittable information are currently resounding throughout the Americas, the United Kingdom, Australia, and New Zealand. Possibilities for restructuring curricula, syllabi, and the physical layout of classrooms, particularly in view of sweeping technological advances that enable students to "converse" electronically with each other and with their professor in between classes, are now being explored. That is the impetus behind many of the collaborative learning projects currently being undertaken at IU, and the impetus behind the Intercampus Group on Collaborative Learning that is preparing this sourcebook.

When and Why Establish a Collaborative Learning Environment?

Learning, in all disciplines, involves role-playing as "experts" in the field. To understand physics, students need to learn how to see the world as a physicist sees the world. To understand history, students need to learn how historians look at people and events. In order to enact the role of proto-biologists or proto-mathematicians or proto-anthropologists, students need appropriate information, language, and experience. They also need opportunities to connect new information, language, and experiences to what they already know and have experienced, so that new understandings are not simply accumulated, but rather are integrated into each student's world view.

Some kinds of learning environments, such as lectures, videos, and individual practice with equipment, foster quick and efficient transmission of essential information and new language or develop specialized skills or techniques. However, unless this new information, new language, and these new skills are put

to use in contexts that replicate or simulate the kinds of work done by people in the field, or, better yet, in contexts where students are really working in the field, the information, language, or skills, reliant upon memory only, may be soon forgotten. When students are involved in the same kinds of problem-solving or creative situations faced by "real" anthropologists, physicists, or mathematicians, they need to integrate information, language, and newly-acquired skills into dialogue and action. Working interactively, using new information and language as they solve problems or create experimental designs or write proposals or critiques, students may enable each other to transform information, language, and skill into discipline-specific understanding, more deeply integrated into their continually evolving view of the world.

Deciding when to use collaborative learning is therefore dependent on the nature of knowledge and understanding that the students are expected to learn and achieve in a particular portion of class time. Convergent facts and information and uniform skills and techniques are most efficiently learned in a lecture style of presentational format. However, application of this new information and these new skills in response to divergent, variable, less predictable real-world contexts is most effectively accomplished in a collaborative atmosphere where students can work together using the newly-acquired information, language, and skills in an integrative and interactive fashion.

Although the above paragraph might seem to suggest a linear sequence of first lecture and then work collaboratively, that interpretation could potentially diminsh the benefits that could otherwise accrue. Alternative organizations hold greater potential for more engaged, more committed learning. For example, students might work collaboratively on a "real-world" problem in order to discover for themselves what kind of information or skills they need to address that particular problem. This will create a context of perceived specific needs for an ensuing lecture, if the needs of the course require a lecture, or a context of perceived needs for individual or collaborative research, and thereby reinforce more concretely the discipline-specific concepts of the course.

Goal-Setting: Who Sets the Goals?

In a collaborative learning classroom, goal-setting is ideally shared by professor and students.

The Professor's Goals

In designing the course materials and syllabus, the professor has both implicit and explicit goals for the students in relation to discipline-specific information, knowledge, and understanding. These goals may be overarching for the entire semester as well as quite specific for a particular segment of class time. Often, professors will specify these goals in the syllabus, or at the start of the semester, or at the start of a class session. When embarking on a session of collaborative learning, whether it be for 15 minutes or extend over several class periods, professors will generally have a desired outcome in mind. The nature of this desired outcome or goal will generally influence the nature and effectiveness of the collaborative session.

Convergent goals with predictable "right answers" will often generate collaborative sessions where students rely on the one who knows most to come up with the right answers. Divergent or open-ended goals, with several avenues of inquiry that could produce a variety of unpredictable responses usually motivate more lateral thinking, and more widespread participation among group members.

The Students' Goals

However, if the professor's goals are the only ones made explicit or articulated in class, students are likely to spend a lot of their collaborative learning time trying to second guess "what the professor wants" rather than devoting their energies to genuine intellectual inquiry. It is therefore advisable to have students formulate and articulate their goals, both at the larger level of the course in general, and at the local level of projects or assignments underway. When students perceive that they are working to achieve their own goals as well as the professor's goals, they generate more commitment to the work of the course.

When students share their goals with other members of the group, each group member can help other members to achieve their goals. When students write down their goals when they hand in their projects, they help the professor evaluate how well students meet the goals they set for themselves, as well as how congruently the students' goals mesh with the course objectives.

Students may need assistance with formulating goals, because, as with the professor's goals, the nature of their goals will influence the nature of their inquiry. For example, when goals are grade-based ("My goal is to get an A in the course), once again, students' efforts are channeled into second-guessing the professor's intentions or standards. However, if the students' goals are course-related and concept-related ("We want to design an experiment that will not only solve the problem, but will not cause further environmental harm" or "I want to write a paper in which every verb is as exciting and dynamic as can be, and every noun is as precise as I can make it" or "I want to show that I understand why people have differing perspectives on this issue"), then students have the means to evaluate for themselves the effectiveness of their collaborative work, and professors also have knowledge about what to look for in their students' work and how to evaluate their success, as well as what they might focus on in future lessons. Similarly, if the students' goal is "We want to find the right answer," the collaborative group will limit their focus and produce predictable, convergent work. If their goal is to "explore the nature of the problem, work out alternative solutions, and determine which is preferable and why," they will more likely commit themselves more deeply to intellectual inquiry.

How are Groups Formed?

Group formation requires decisions about size, composition, and duration. These decisions are so dependent upon the nature of the discipline, the particular project, the size of the class as a whole, and available resources that generalizations are difficult. With that caveat in mind, I offer the following observations and conclusions based upon current research and past experience with collaborative groups.

Size

Groups can range from two to two hundred. In my experience with writing classrooms, I have found that ideal group size ranges from three to seven. Fewer than three severely constrains the range of inquiry, while more than seven limits the amount that each member can actively contribute in a given portion of class time. In composition classes of twenty-five, I favor groups of four to five members. That way, each group member has ample time to share writing goals, problems, and concerns, while having ample opportunity to engage in the writing concerns of three or four other students in the same course working on the same assignment.

At the same time, there are on the IU campuses large introductory classes of 300-400 students that are effectively divided into groups of twelve to fifteen students to discuss and explore new concepts presented during large lecture sessions. Examples of how to set up effective collaborative learning groups in large sections are included in this sourcebook.

Also, for quick exploration of a new concept or use of new discipline-specific vocabulary, five minutes of talk in pairs can very effectively enable students to integrate the new language and concepts more readily, while not requiring additional resources in a large lecture hall accommodating 300-500 students.

Composition

Here rages a critical issue in grouping. Grouping should not be confused with tracking, which stratifies students into homogeneous levels, usually based on some quantified equivalence of supposed ability or depth of knowledge. The composition of groups is primarily dependent upon your purpose for grouping. Based on the assumption that your primary purpose for grouping is to enable your students to explore more deeply and more broadly the concepts in your course, to work with new vocabulary and new concepts, and to discover that each can validly contribute to the making of meaning in your discipline and help each other make connections leading to a richer understanding than would be possible in passively received information-transmission, the following principles of group composition are suggested:

a) heterogeneous groups are more effective, in general, than homogenous groups. Whether the heterogeneity consist of variations in age, gender, ethnicity, supposed ability, or other attribute, this principle holds true. A major exception involves thematic interest: groups of students interested in the same issue or wanting to explore the same theme or concept will usually work effectively together.

b) random grouping or student-selection is usually preferable to instructor-determined groups. When instructors determine the groups, students are fulfilling the instructor's agenda rather than their own, and the group work will be just one more thing they have to do to please their professor. At the same time, in order to satisfy the first principle, bearing in mind that like usually selects like, professors might want to provide opportunities for students to work with a number of different students in the class before selecting a group for a lengthy project. For short projects, random grouping is effective to enable students to get to know each other, especially on a commuter campus where students rarely socialize or meet outside of class.

However, there are always exceptions to the above principles. Some of my Afro-American students have felt silenced in a group where everyone else is white; many others have not. Also, a large, federally-funded project on the Bloomington campus groups students according to their profiles on the Myers-Briggs inventory of characteristics, ensuring that no two students with the same profile are in the same group, with apparent success. A case study of this project is included in this sourcebook.

Probably one of the most frequently asked questions about grouping, by both students and their professors, is this: "Isn't it just a case of the blind leading the blind?" Assuming one could find a truly homogenous group with similar backgrounds, motivations, and educational experiences all of whom felt absolutely lost in a course, this might have some particle of truth. The more varied the composition of the group, and the more competence and confidence that students develop in drawing upon and sharing their reserves of tacit knowledge to forge connections with and among discipline-specific concepts, the less valid this statement becomes.

However, that leads to the next most frequently asked question about group composition: won't the highly-motivated, "good" students do all the work while the others just latch onto their ideas and efforts?" The answer: less often than is supposed or feared. Research has shown that all students can benefit from group work: in general, the least able benefit the most, and the most able benefit the least, but all can benefit. If each student sees the benefits to be gained, and sees that he or she can contribute meaningfully and participate fully, and if each student is enabled by the course and class organization to do so, then each student will be motivated to engage in collaborative learning with commitment.

Duration

Again, there are no easy algorithms, just some context-dependent principles. Groups can last from a few seconds to an entire semester, depending upon their function in the coursework and class organization. For example, in writing classes, building trust and confidence in fellow group members is important, so groups tend to last a long time: a month, half a semester, or even a whole semester. At the same time, you want students to feel part of a whole class, and get to know others in the class, so you might have students in a group that lasts a long period of time, but then utilize other groupings of other sizes and composition for sharing insights or exploring alternative solutions or otherwise engaging with discipline-specific concepts.

How Do You Accommodate Individual Differences?

The most frequently mentioned areas of individual differences that instructors fear will be neglected or overlooked in collaborative learning groups are the following:

a) (assumed) ability
b) amount of work a student is willing to contribute
c) motivation and drive
d) level of quality satisfaction

e) comfort level in group situations.

(Assumed) Ability

As mentioned above, research has shown that all students benefit from collaborative learning environments. However, the nature of that collaborative learning environment influences how students of differing abilities respond. Typically, if group work is intended to produce "right answers" or a group assignment that could be completed by one person, then the group will tend to rely upon the most capable student(s) in the group. However, if the collaborative learning environment is structured so that all students are invited to participate, that all have a vested interest (not just in marks but in commitment to the project), that all can respond to opportunities to give help as well as receive help within the group, then students of all abilities can work together effectively.

It might be helpful at this point to review the four most significant features of what is meant by "collaborative learning" in this sourcebook:

(1) working together results in greater understanding than would likely have occurred had the students worked independently;
(2) spoken and written interactions, or interactions involving any semiotic system of signs, contribute to this increased understanding;
(3) opportunity exists for students to become aware, through their classroom experiences, of relationships between social interactions and increased understanding;
(4) at least some elements of this increased understanding are idiosyncratic and unpredictable, consequences of the interactions of individuals with differing backgrounds, motivations, and educational experiences working together on the same or similar intellectual challenges.

When these features form the core of the collaborative learning environment, individual differences become part of the rich culture of the group rather than a detriment to any member of the group.

Amount of Work a Student is Willing to Contribute

Again, this becomes a more or less significant factor depending upon the nature of the assignment, the means of evaluation, and the other life demands of individual students. In writing classes, where each student works at home on his or her own composition, and then brings drafts to the group with questions soliciting response and commentary, the amount of work any student is willing to contribute reflects more on his or her composition than on those of others in the group. At the same time, the fact that each member of the group is directly asking other members for response and commentary continually invites valid and potentially helpful work from all group members. The synergy of group discussion and member-solicited responses (as opposed to response sheets of questions prepared by the professor) puts a heavy onus on each student to participate during class time, even if the student has been unable to prepare adequately to have his or her own work responded to. The pressure grows throughout the semester to come prepared as the benefits potentially accruable from this preparation become increasingly obvious.

Motivation and Drive

Although similar to and often congruent with the "amount of work a student is willing to contribute," motivation differs in that while the former is often influenced primarily by external circumstances, the latter is influenced primarily by inner goals. That is why having students determine their own goals within the context of the general goals of the course is so important in establishing a collaborative learning environment. When students are involved and assisted in determining their own goals, their motivation and drive, directly linked to their inner goals, will generate a stronger commitment to coursework than when students are figuring out how to meet the teacher's goals. When students articulate their goals to their fellow group members, the implicit (or explicit) assumption is that the group takes on board the responsibility for helping each of its members to meet these goals. Motivation and drive become part of the synergy of the group, while still remaining an essential factor for each individual member.

Level of Quality Satisfaction

Level of quality satisfaction, the level at which a student is satisfied with the work and is ready to hand it in, is again as often linked to external circumstances as it is to alleged or assumed ability. However, frequently students who do not perform well at the college level, who hand in work that seems hurried, careless, unfinished, or not thoroughly thought through, have brought to the university learning attitudes and behaviors developed at earlier stages in their education. When meeting regularly with students who do perform well, and who have developed the kind of intellectual behaviors that enable them to perform well, these seemingly less able students observe and often develop ways of learning that can help them learn more effectively, with greater interest and engagement.

Comfort Level in Group Situations

Comfort level is usually based on a combination of several factors, such as previous experiences with group work, degree of confidence with the subject matter, and the process of school enculturation which focuses on individual achievement. The nature of the collaborative environment being established can substantially influence the comfort level of students who are anxious about working in a group. If students perceive collaborative learning as group work for the sake of group work, or for the sake of teacher-efficiency, or to fulfill an agenda that does not fit into their objectives for taking the course, then students may not participate willingly or comfortably. By acknowledging students' apprehensions through a curriculum and structure that demonstrate why collaborative learning will enable students to more fully integrate new concepts, skills, and information with their previous understanding of the discipline, instructors can build towards an increased comfort level. To facilitate the establishment of trust in the effectiveness of collaborative learning, instructors can draw upon some of the strategies described in the section on introductory collaborative activities in this sourcebook.

How Does Collaborative Learning Influence the Teacher's Role?

In lecture situations, instructors control the content knowledge as well as the system of content delivery; instructors are the "experts." In collaborative learning situations, content and mode of inquiry are more divergent, requiring greater flexibility in the role of the instructor, who may not be "expert" in all possible fields of inquiry embarked upon by their students. I can't think of a more exciting

opportunity to learn from students and to short-circuit the boredom that comes from teaching the same content the same way semester after semester! At the same time, I can appreciate the challenge that this situation presents to faculty members who feel strongly responsible for being able to lead their students to newer understanding through the instructors' advanced and current knowledge in the field. Many faculty members feel they are shortchanging their students unless they are foremost in the classroom with content knowledge in every aspect of the course.

In a collaborative learning environment, teacher and learner roles are often blurred. All learners become teachers within their group, as part of their learning is tightly involved with their assisting their fellow students with similar kinds of inquiry that might lead them down different paths to different kinds of understanding. Similarly, teachers become learners as they see how each of their students establishes different patterns of inquiry, different routes to problem-solving, and raises different questions than normally mandated in the traditional curriculum. At the same time, with their vaster understanding of the field, and of how to locate information or to seek new ways to solve problems, instructors offer essential assistance in guiding students along their paths of inquiry, enabling them to see the significance of well-made or less well-made intellectual decisions.

Competitive -- Collaborative: Dichotomy or Continuum

Political and business-centered rhetoric about education often reiterates the notion that Americans are losing their competitive edge in the world market. Arguments typically ensue about the need to raise SAT scores, or other quantitative measurements of so-called "standards of achievement." Even as this rhetoric flourishes in the media, we realize the need for collaboration among nations, and among the people who make up those nations, in order to make best use of the world's resources while striving towards the best possible standards of living for all people. Certainly we want our students to develop their competitive edge when battling forces of privation, domination, and disease. But this competitive edge can best be developed in an environment where people learn the importance of working together for each other's greatest good, whether that "greatest good" involve writing a better composition or discovering a cure for AIDS. And that learning environment should also enable students to define for themselves and learn how to negotiate among each other what is meant by "greatest good" -- or by any other discipline-specific abstraction that often goes unquestioned.

The competitive-collaborative continuum will function naturally in most groups, as students strive to do the best they can as well as work hard to help their fellow students, taking pride in participating in the intellectual development of themselves and their group members. The cooperative learning movement (quite different from the collaborative learning movement) recommends strategies such as rewarding groups who accumulate the most points or the most right answers. This kind of competition can militate against the benefits of collaborative learning, unless, of course, the course content is entirely convergent and replete with "right answers." Also, it ignores the value of intrinsic rewards in favor of extrinsic rewards, and is therefore highly suspect and problematic as a learning strategy, except when there is an urgent or imminent need for specific and convergent "right" answers.

What Relationships Exist Between Group Dynamics in Collaborative Learning Environments and the Work Force?

That the market economy of the United States is motivated by and built upon individual competitive drive is undeniable. However, equally undeniable is the need for collaborative endeavor at all levels of the economy in order to recover from the current recession (in the short term) and to create a significant role for the United States in the World Market Community (in the longer term). Researchers such as Andrea Lunsford and Shirley Brice Heath have shown the increasing use of collaborative endeavor in the work force of the 80's and 90's. Spurred on by successful collaboratively-organized companies in Japan, American CEO's are involving both workers and management in more collaboratively-organized projects. Obviously individual drive plays an important role, as it always has done. However, the business community is increasingly acknowledging the need to have workers able to think for themselves in the company of others, and to negotiate alternative paths to success (or alternative solutions to a problem) within a wide range of perspectives and possibilities. Experience with collaborative learning environments at the university level will introduce students to the skills and benefits of working collaboratively.

Evaluation: How and What do You Evaluate in a Collaborative Project?

The sourcebook will offer a whole unit on evaluation of collaborative work. Again, because collaborative projects are so context-dependent, generalizations are difficult. If each student in a group is working on his or her own project, then evaluation of the product can proceed as it usually does, in relation to the student's goals, the teacher's expectations, and the objectives of the course. If the project is a group project, then the product can be assigned one grade, with each student having the same grade. However, since concern frequently arises about "coasters" in this scenario, I sometimes recommend an alternative that has worked with students in a number of educational levels. Instead of a grade, assign a mark based upon 100% x the number of students in the group. For example, a "B+" level project in a group of 5 students might be assigned 420 marks out of a possible 500. The group then decides how to divide the 420 among each of them, since they know how much each member has contributed. This way, both instructor and students have an important role to play in the evaluation. I offer this example as just one of many ways to evaluate single projects worked on collaboratively. Additional models of evaluating collaboratively produced projects will be offered in the unit on "Evaluation."

Some faculty members are also interested in evaluating the process of collaboration. Differences of opinion abound. For example, in a collaborative learning environment, process and product are ideally so strongly interdependent that evaluating the product virtually involves evaluating the process. However, many faculty feel that students will contribute more effectively to collaborative work if their contributions are rewarded with grades. Even more important is the idea that evaluating collaborative processes will heighten students' awareness of the social construction of knowledge, and of how certain ways of negotiating different

perspectives can lead to increased understanding. Again, several models of process-evaluation will be discussed in the unit on "Evaluation."

The Politics of Collaboration: What Does It Mean in Terms of Classroom Organization?

The concept of "collaborative learning" -- as opposed to "doing group work" -- represents a paradigm shift, not just a teaching activity. It implies -- no, demands -- a democratization of learning in the classroom as students take greater charge over and responsibility for what and how they learn. Similarly, both students and instructors become involved in questioning what learning a particular discipline really involves -- what is the nature of knowledge in a particular discipline, and how do students move from apprentices to journeymen to confident contributors within a particular discipline? What are the root metaphors and governing paradigms of particular disciplines, the hidden assumptions that mystify the discipline for those "not in the know" and demystify it for those who are learning it? These are the hard questions that both students and faculty members need to address explicitly in a collaborative learning environment. In terms of classroom organization, it demands that students plan more, talk more, and actively engage in determining what and how they learn; it demands that faculty plan differently, lecture less, and actively participate with students in determining what and how they learn. This, in turn, implies different uses of classroom space. How to accomplish the physical as well as curricular reorganization of classrooms, from seminars of 10 and more to lecture halls of 300-500 will be discussed in later units in the sourcebook.

What Are the Implications for Restructuring Higher Education?

Uri Treisman's work with Afro-Americans and Asian-Americans at Berkeley has shown dramatically that establishing a collaborative learning environment can increase retention of students beyond the graduate level to masters and doctoral levels. Our recent work with collaborative learning on the IU campuses similarly suggests that students in disciplines with a collaborative learning environment during their freshman year will often choose to major in that discipline. As yet we have no quantified data on either choice of major or student retention, but we are anticipating setting up a research project to determine whether our assumptions and intuitions about retention and choice of major on IU campuses mirror what has been happening on the Berkeley campus. The early work of George Malacinski in Biology (Bloomington campus) suggests that we might indeed find a correlation.

If so, then the entire freshman experience will need to be reconceived to provide opportunities for collaborative learning, particularly with the burgeoning percentage of non-traditional students on our campuses.

To Conclude

My intention here was to define how this sourcebook will be using the term "collaborative learning" and to introduce many of the most frequently raised

questions, issues, and concerns about collaborative learning. The next section of the sourcebook will unpack these concepts and issues, and offer strategies to enable faculty to develop effective collaborative learning environments in their classrooms. The final section offers several case studies of IU faculty who are already using collaborative learning in their classes.

FEARS, ISSUES, AND CONCERNS ABOUT COLLABORATIVE LEARING

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The purpose of this paper is to discuss a few of the aspects of collaborative learning (CL) that bother some of my colleagues, my students, and myself. I'll tell our "stories" and then comment on them. I have used collaborative learning as a teacher in several settings--literature, writing/rhetoric, language classes in English departments in the United States and Malaysia and content area reading classes in an education department. I have been a promoter of collaborative learning as a supervisor of assistant instructors teaching reading courses, an assistant director of writing charged with developing roundtables/seminars for full-time, part-time, and assistant instructor writing teachers to enhance their professional growth, and as a writer of articles published in various journals for teachers of social science. The stories come out of these experiences.

My Colleagues' Stories

Every year, as Assistant Director of Writing at IPFW, I set up a roundtable on collaborative learning with panelists discussing its features and its rationale, their classroom experiences with it, making available copies of successful handouts, and answering questions about collaborative learning from the other writing teachers. I also sent out questionnaires before and after the roundtable eliciting possible topics, questions, and concerns about collaborative learning. The goal was to persuade the teacher to make use of collaborative learning or more varied use of collaborative learning in their classrooms. Some were hesitant to try or to try again.

Here's Max, an English major and an AI for introductory writing courses (but he could be an AI in any department).

> Max: "Look, I'm brand new at teaching writing to college students. I'm still trying to learn the writing/rhetorical concepts myself, develop a syllabus that's workable, keep up with all those papers and student conferences, read the textbook, besides doing well in my own courses. Collaborative learning may be a good technique for experienced, full-time teachers but I can see it's complex, messy, and risky. I just don't have time to fool around with it, and I certainly don't need any more stresses. It's taken me a long time to gain credibility with my students, since I'm so young and many of my students are much older than I am. I don't know enough about how to do it well. I'd be sure to have it flop. Maybe later."

Max has reason to be concerned. Harvey Wiener (1986) has written about the problem of ineffective collaborative teaching and learning because teachers do not really understand the concept and what it entails. Thus, they do not take the necessary steps of preparing students to engage in collaborative learning, preparing good written statements of the task, implementing the task, and synthesizing the

results of the groups. Collaborative learning is structured, not unstructured. Teachers need to do more than tell students to collaborate and hope for the best. Wiener emphasizes that collaborative learning is messier in practice than in theory.

I tried to reassure Max by giving him a copy of Harvey Wiener's article with its many suggestions for effective collaborative learning classrooms and also copies of articles by Rebecca Burnet (1990) and Charles Side (1990). I also suggested that he work with Jim, an AI experienced with using collaborative learning successfully in a mentoring situation. I talked to Jim, suggesting that he invite Max to his classroom during all phases of a collaborative learning project and that he give him copies of his syllabus and handouts. I then gave him copies of my syllabuses, materials I had found useful, invited him to come and talk to me about specific fears and concerns, and to visit my classes. Max may be too busy to do all of these things now, but by next semester or next year, I'm betting he'll take the risk.Sue, a part-time writing teacher with a full-time job during the day, has different concerns.

Sue: "It's just too hard for students here at IPFW to get together to do one of our papers as a collaboratively written project. I know you would like us to work collaborative writing into our syllabus, and I agree it's a good idea, but I don't want to deal with my students' complaints about no time and no place to meet. I can give them some time in class, but not as much as they'll need to do the project. Don't you realize this is IPFW--not IUB! I was a student here myself a few years ago, and I remember during my last year--spring semester--I had to do three collaborative projects for different classes. I almost went crazy! There were (and still are) few places on campus to work decently on group projects. The library took away the study rooms to use for teacher offices, every classroom was busy every period day and night, the cafeteria was open only at noon and was busy and noisy then, I had a part-time job, I lived 25 miles from campus, people in my groups also worked and were scattered all over Fort Wayne and surrounding areas and on and on."

I told Sue that I could relate to her frustration since I have faced the same problems in my classes. A commuter, non-residential campus with mostly untraditional students provides many challenges for collaborative learning activities that require working out of class (and many do). So far I have not found any collaborative learning literature that discusses this aspect of implementation--perhaps because most articles are written by authors at residential colleges with traditional students. I don't have many suggestions for Sue. She should, of course, give as much class time as possible to the project, consider different bases for grouping students such as groups based on geographic areas, times on campus, and access to computer networking. But none of these are the perfect solution.

I remembered Craig, one of my former students, and told Sue how he solved the problem. Craig was an older student in my basic writing class determined to do well in the class. He had a good job and knew a great deal about motivation. His group consisted of younger students, not too committed to collaborative learning. To get his group to be a committed, smoothly-running group, he decided to invite them to meet at his house. At one meeting late in the evening, he ordered and paid

for carry-in pizza for all as a motivating strategy. Another time he invited them over to his house early on a Sunday morning, and he cooked breakfast for them because he believed strongly in incentives. The group became cohesive and committed during these informal eating events, and the paper that resulted was a big success-an example of real collaborative learning. So naturally Craig and the other members were very pleased. I'm not sure that this strategy would always work but it might be tried by other groups as a partial solution to institutional constraints. Institutions really must begin thinking about the constraints they place on learning and collaborating. And, it is time that collaborative learning scholars begin addressing the nuts and bolts of implementing collaborative learning projects in different institutional settings--that they begin addressing social contexts.

My Malaysian Students' Stories

Aida is a political science major who is frustrated in her discussion group because of gender problems.

> Aida: "It's now March, and I've become discouraged about my discussion group for political science. I came into my assigned group hopeful--hopeful I would learn from the others and that they might learn from me, too. But it was soon clear that the three boys were dominating the group. I would try to express my ideas, but the boys, after giving their opinions, would just tolerate my opinion. They let all my ideas drop--there was lack of interest in what I had to say, a lack of valuing, no probing, no extending what I said. And this was true for the other girl in the group, too. We girls were definitely subordinate--just tolerated."

As a woman, I can empathize with Aida. Gender problems, one type of interpersonal, group dynamic problems, do exist in collaborative learning and must be addressed. And there are no easy answers, either. Sherron Keaton (1990) admits there are communication gender gaps--it is a variable in managerial communication and also in collaborative learning. Keaton discusses the literature on men and women's language behavior--the research on the interruption patterns of men and topic shifting, the research on women's tag questions, disclaimers, unfinished sentences, word choices, and so forth. But we find no solutions to the gender gap problems offered. Mary Lay (1989) discusses gender problems as well as strategies groups can use to lessen this kind of interpersonal conflict. She advises an equal balance of male and female language strategies. Men and women should first understand each genders' strategies and then men should adopt some of the women's strategies and women should adopt some of the men's strategies. She says research indicates female language strategies are generally more helpful in promoting effective collaboration. Essentially she thinks effective groups reconcile gender differences, striving for congruence.

Jim Porter (1990) however, isn't so sure. In his article he discusses gender as one of the ideologies that interacts with and influences collaborative learning. He states that ideology (beliefs that seem natural and self-evident) about gender, race, academic discipline, style of dress, and so on influence group dynamics and examines a case that illustrates how gender ideologies worked in his writing class. Porter would like us to consider whether gender conflicts are really harmful or

might teach students to accept and value differences, plurality, and discensus. Teachers, he believes, face ideological decisions as to whether gender conflicts are beneficial or harmful to effective collaborative learning. I have no answers, either, but I am sure that teachers need to think about and discuss gender conflicts with their students and that we should address this issue more often and more carefully in the future collaborative learning literature. And I told Aida to hang in there and not to generalize from one bad experience. Her next collaborative group experience might be a model of plurality and valuing of gender differences--but to prepare for it, she should read all she can about gender differences in groups.

Norizon, Mas, Yati, and Aida are female Malaysian students at universities in Indiana and Wisconsin--former students of mine in Malaysia who had successful collaborative experiences in my writing and literature classes there.

Norizon: "In my psychology and sociology discussion groups I worry about being from a developing country, Malaysia. I worry that the American students in my group will underestimate what I know and my ability, thinking international students like me won't be worth listening to. I'm afraid that there may be a stigma attached to being from Malaysia. During discussions, I hold back, I'm afraid. They don't know me, they are unfamiliar with "where I'm coming from" in my thinking--they are unfamiliar with Malaysia, my culture. When talking, I choose my words carefully so as not to offend anyone. I hold back. I'm shy--I am a Muslim from the conservative East Coast of Malaysia. Where I come from, talking to boys is taboo--even in a group. It's not considered lady-like. I'm insecure because of using the English language. And my secondary schooling was based on the British system: the teacher talks, lectures, "blah, blah," no tests, no notes taken, students accept what is said, teacher is the authority. But at the Indiana University Cooperative Program at the Institute Technology Mara (ITM) where I went for two years and where you taught me professional writing, they tried to change us students--to prepare us for American university classrooms. But they weren't altogether successful. Now that I'm at Indiana University, Bloomington, I find that in my collaborative groups I revert back to not challenging, not questioning. I don't have any other Malaysian students as a support group as I did at ITM."

Mas: "Well, I've never had any trouble yet in my economics collaborative group. Of course, the Americans are curious about me. I look different. I dress differently. My American friends encourage me to speak up and express my opinion. But I've always been a talkative girl. I do think there are cultural differences though about belonging to a group. In Malaysia, we seem more responsible, more committed to the task, more sensitive to people's needs, more willing to take criticism, wanting to really do our best, and at the end of every group meeting, we always apologize to the others in case we hurt their feelings. That's our culture. I don't see this so much here in my American economics group, and I am concerned about these cultural differences."

Yati: "At first I really felt left out in my psychology group. I could not understand the jokes--students would laugh and forget I was there, not

understanding the humor--just sitting there. I was an outsider, lost. I was scared, too. I thought they were trying to avoid admitting me to the group. They stared at me, dressed in my Muslim headpiece and clothes. They used slang I couldn't understand. So I sat quietly for a few weeks. Then I started to talk a little, using short English sentences. I was concerned about the sensitive topics (to Malaysian Muslims) chosen for us to discuss like sex (the male sex jokes, infertility, condom talk) and surrogate mothers. I thought we should have had general topics first while we got to feel comfortable with each other, before the sensitive topics that are almost taboo in Malaysia. But I felt more accepted when we were talking about surrogate mothers and I asked, "So what do you think of the child's emotions?" and then everyone picked up on that and talked. What really surprised me was the Mid-west students. They are so conservative! Not at all what I'd been led to believe about American culture--not like liberal New York or the West Coast. I found the students rigid and inflexible on these sensitive topics. This was discomforting to me--especially their conservative views on homosexuals. I was more liberal than they! In spite of my religion and culture!"

Aida: "When the semester started, I was afraid my political science group would not understand me--because of my pronunciation of English. And sometimes they did not. They asked me to repeat or asked me what I said. I was afraid they would think that my ideas were not as good as theirs. I worried about not being able to contribute ideas because I didn't know much about U.S. history, the background of political elections here. I worried about my lack of experience in discussion. In Malaysia, the teachers in my secondary and elementary school did not value students' ideas, and peers did not value each others' ideas. And we had no experience in thinking critically. We just memorized and sat quietly. I really felt unprepared for political science collaborative groups."

From these stories, you can see the fears, concerns, and issues for these international students. Most of their concerns hold true for other minority students, too, including the lone male or female in a group and the lower class or affluent upper-class students. The interpersonal, group dynamic problems are there in every classroom. Teachers cannot shut their eyes. The different ideologies can be devastating or liberating to members depending on how aware the teacher and students are of cultural differences and their potential to help or hurt collaborative learning. I remember a group of three students in my basic writing class--an older native American woman (Pat), a younger African-American girl (Delores), and a young middle-class white boy (Les). It was a disaster. The two females hated each other, refused to meet, called each other derogatory names--and the boy just gave up. The two females had different work ethics and values; Pat tried to dominate as leader. Delores resisted Pat. Les was uncommitted. There was no group. Finally, Pat and Les came to see me--several times. I listened, mostly, and tried to persuade them to reflect on the ideologies, goals of the task and its relation to life beyond the classroom and to try again. They procrastinated almost to the end, but finally decided to try again. They learned much about solving conflicts. So did I.

Articles discussing international communication (Boyd, Ford and Lewis, 1990; Iandoli, 1990; Joy, 1990) are helpful for making teachers and students more aware of problems. They point out that every person today should be prepared to work and live in a multicultural, international environment. The problem is that many students and workers lack skills necessary for success in collaborations in such an environment. Some of the cultural barriers to collaboration involve patterns of conversations, courtesy, task versus time and space concepts, group versus individual behaviors, differences in listening, speaking, argumentation traditions, religion, and customs and humor. Part of the preliminaries should prepare students concerning these barriers. This means some research on the teachers' part and input to the class on the students' part. Like the gender influences on collaborative learning, the multicultural, international influences must be examined more by the collaborative learning scholars.

My Story

Avon, an English teacher with a Ph.D. in Educational Psychology--Learning and Instruction--has some concerns about the notions of learning, collaboration, individuality, and collaborative learning.

Avon: Sometimes I really wonder about the people advocating and writing about collaborative learning. What do they mean by learning? I don't think they always mean what I mean. I don't see any references made to scholars in learning theory and researchers of learning. What do they really know about learning? Have they read in this field? While working on the educational psychology degree at the Center for the Study of Reading, University of Illinois, I worked with scholars interested in individual difference effects on learning, metacognition (knowing about one's knowing), schema theory, prior knowledge effects on learning, the zone of proximal development, misconceptions, cognitive processes, effects of affect (emotions) on learning, remembering, and comprehension, reciprocal teaching, apprentice models of learning, and many more areas. But I have seen no references to scholars such as Ann Brown and her work on metacognition, dynamic assessment, planning, and supportive environments for learning; Anne Marie Palinssar and her work on reciprocal teaching (student-teacher, student-students); Rand Spiro and his work on reconstructions in memory, schema theory and experiential learning; David Pearson and his work on comprehension and assessment; Robert Tierney and his reader-writer negotiations; Tom Anderson and Bonnie Armbruster and their work on content area learning (science, history)--and I could go on. And who reads about Lauren Resnick and her colleagues' work on learning (especially math learning) at the Learning Research Center for Development in Pittsburgh? Or about the work in collaborative planning at the Center for the Study of Writing at Carnegie Mellon University?

Instead, in the CL literature that I've read, we read about Richard Rorty, Clifford Geertz, Thomas Kuhn, and Kenneth Bruffee; British social constructionists, Marxist theories, social action, cultural criticism, radical pedagogy, and so on. Now I believe we should be reading these scholars and about these notions. In fact, I believe in a social constructionist ideology--mostly--and am convinced we have all been enriched by this focus on social context and its influences on all of us. My research is grounded on Michael K. Halliday's social

view of language and his interpersonal meaning potentials and enabling text functions of language. And I have published articles for social studies teachers promoting social studies classrooms that are really social and that are grounded in the notions of collaborative learning and rhetorical theory (Crismore 1991a; 1991b).

So I have concerns and conflicts. I am drawn both to individual learning processes and to collaborative learning processes and to the theoretical underpinnings for each. I don't like an "either-or" mentality. I see value in both and in making classroom decisions based on both ideologies. My classroom goals are to help my students learn how to learn, first of all, and then to learn the subject matter of the course, recognizing that it will be socially constructed knowledge. I also want them to achieve some of the goals of collaborative learning such as constructing their own knowledge regarding the subject matter, working with others productively, solving problems, gaining multiple perspectives on topics, gaining interpersonal skills, and so on. My goals are more limited than some since they are not the more radical social goals. I feel, too, that cooperative learning ("mere group work") is valuable, even if the teacher does maintain an authoritative role and do most of the work. In my classrooms I want a balanced approach, an eclectic approach to learning.

In his article on collaborative learning in the classroom, Harvey Wiener (1986), quotes from a letter he received from Harvey Kail:

> . . . Sometimes I find myself back in the old world where knowledge is 'out there'. . . . Other times, more frequently, now, I see conversation, its give and take, as the central manufacturing process of knowledge and appropriate ways of talking (and writing) as the goal. At the same time, I also believe that the lecture is a perfectly legitimate mode of teaching, even within the boundaries established by CL theory. So . . . I contradict myself . . . very well . . . (p. 50).

That's the way I feel, too, about many issues: "I contradict myself... very well..."

From my reading of the CL literature, I find others have concerns, too. Drawing on Heidegger, James Cross White (1991) argues that individuality is essential. He believes that individualism is essential for students, that the experience of individuality is important in a liberal education. We need students, he claims, with an interest in autonomy, and we must be informed both by social perspectives on knowledge and learning and by concepts of individuality which can illuminate the uncertainty of such perspectives and help us measure the meanings they offer. Many of us accept and value the assertions that we need a more cooperative society, a more critical stance toward authority, and a more open and relative view of knowledge. But David Smith (1989) believes that CL methods are not necessarily better at teaching these values and attitudes. After all, he argues, he and other sympathizers learned their values from traditional lectures, recitations in traditional classrooms, and at present there is no empirical evidence that CL methods are superior. He wants teachers to adopt a critical stance when they devise teaching strategies and to analyze claims about the advantages of a particular strategy over others, becoming aware of the assumptions, reasoning, and kinds of evidence various theorists use to support their claims, and this includes collaborative learning claims and strategies. According to him, we need to know

more about the dynamics of groups and the tensions they create between individual creativity and social conformity. "We need to know exactly what produces effective learning in collaborative pedagogy--the structure, amount, and range of type of response or the sheer time spent in practice. Whether collaborative learning . . . more adequately mirrors language as a social activity, whether it improves learning more than other techniques--all of this is still open to question" (p. 58). In sum, we have learned much about collaborative learning, but we still have much to learn and to reflect about in order to address the fears, issues and concerns raised here.

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CREATING A COLLABORATIVE COMMUNITY: SOME SKILLS AND OPENING MOVES

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People are not born with the interpersonal and social skills needed to work in a collaborative fashion. They learn these through interacting with others, in their families, their neighborhoods and in other community organizations. In school settings, they learn a set of skills that will help them succeed in an academic setting. In traditional schools settings, the skills learned are the ones that will ensure success in a competitive environment. This focus on individual achievement and efficiency is not conducive to sharing of ideas and negotiating social reality. Value is placed on a narrow range of sources for information acquisition and those sources are primarily written. Students coming from this paradigm of education will have difficulty being successful in collaborative settings unless skills and attitudes compatible with collaboration can be embraced.

Students coming to the University are those young adults who have been the most successful at mastering the skills of competitive academics. In a recent survey undergraduate pre-service teachers enrolled in the required general methods course, they reported that over 70% of their instruction in high school was via the lecture method (Bosworth, 1992). The skills (such as not talking, notetaking, passive listening, memorization, etc) required to learn from lectures are quite different from the skills needed to be successful in collaboration. Thus, college instructors who wish to have collaboration in their classrooms, can not ignore the importance of these skills in preparing materials, assignments and collaborative activities.

College instructors need to be aware that their students may have a range of collaborative skills. This has implications for the kinds of and sequencing of collaborative activities during the class. Many (Johnson, Johnson & Smith, 1991) advise assessing and teaching collaborative skills in a direct manner. Others (Nelson, 1991) use indirect methods such as study guides and assignments that progressively increase the collaborative skills needed to complete the assignment.

Figure 1 shows one categorization of interpersonal skills that lends itself to instruction. This schemata includes three main categories: social, organizational and communications. Social skills include those skills necessary to form working relationships and to begin to build trust in the classroom (Eg. knowing other's names and identifying commonalities). Organizational skills focus on leadership and administrative skills that are necessary to keep a group function regardless of the group's task.

Communications skills are divided into three subcategories: conversational, inquiry and conflict resolution. Conversational skills include listening, sharing ideas and feelings, and taking turns. These skills keep the conversation moving and are the necessary basis for further learning. Inquiry skills are fundamental to any collaboration in the college classroom setting. As individual members of a group socially negotiate meaning and ask and answer their own questions about the topic, it is imperative that they are equipped with sufficient skills to probe further

for meaning, seek elaborations and accept and evaluate divergent ideas. Finally, group members have to resolve conflicts, both of ideas and personalities. The more skilled a group is at resolving differences, the more time they will have to spend on content and task related activities. In a collaborative college classroom, instructors are teaching process as well as content. Building trust and a sense of a community in the classroom is the first interpersonal skill that needs attention.

CATEGORY	SKILL
Social	• Know names • Identify commonalities
Organizational	• Take on roles • Maintain cooperative responsibility to large group • Encourage participation by all • Summarize (agenda/process) • Integrate ideas into single position • Check group's progress • Set agenda • Assign tasks • Develop process: (e.g., action items, conflict resolution, governance, decision making)
Communications Conversational	• Stay in group • Use quiet voices • Take turns • Maintain eye contact • Do not display any socially offensive behaviors • Use effective listening habits • Share feelings and ideas • Display sensitivity to others' positions
Inquiry	• Ask for facts and reasons • Ask for help and clarification • Express support and acceptance of divergent ideas • Seek accuracy • Seek elaboration and examples • Probe • Criticize ideas not people • Explain and clarify • Extend answers
Conflict	• Be open about conflict • Understand others' positions • Check for consensus • Seek basis for lack of consensus • Express disagreement constructively • Seek higher level synthesis

Figure 1: Groupwork Interpersonal Skills

Collaborative Activities

Although the term "collaborative learning" is relatively new in pedagogical terminology, many of the observable "activities" are part of most educators' pedagogical repertoire. Similarly, they are part of our students' social repertoires as they learn about the world of their families, neighborhoods, and wider communities. Even so, both students and educators will at times experience discomfort "getting started" in a collaborative learning environment. Recognizing and building upon the connections between a collaborative learning environment and teaching/learning activities that you have already found successful may dispel much of this discomfort.

The purpose of this section of the sourcebook is to introduce you to a few activities that will orient your students to the verbal activities and epistemological expectations and socio-intellectual possibilities of a collaborative learning environment. The reason for offering just a few is an integral part of establishing a collaborative learning environment. If you and I were talking with a group of colleagues, and the question about shaping a collaborative learning environment were to come up, I would most likely mention one or two things typical to the opening sessions of my own classes and then ask our other colleagues to contribute their own stories. In this way, we would collaboratively build a response to the question, with everyone a contributing participant, and with everyone in a situation to find out more than (s)he knew before. But you and I are not talking face to face, and I therefore am in the paradoxical situation of didactically explaining how to set up a non-didactic learning situation. The examples I mention, therefor, are intended to serve as catalysts for you to create your own versions more closely tied to your own discipline, rather than as activities for you to replicate.

Introductions

Most of us forget names when we hear too many in too short a time. Many educators have students talk in pairs about their fears or hopes in relation to the course, their goals for the course, and so on, and then have each member of the pair introduce the other to the rest of the class. Many variations of this activity are possible (and necessary in larger classes, which may require a different sort of group breakdown. For example, in a large lecture hall with over 100 students, you might just have students turn to the student on the right to introduce themselves).

Potential benefits: students become the early focus of the class; they enter the classroom dialogue with their own voices; they learn about other students' hopes and fears and goals; they feel individually important within a group.

Potential liabilities: We've all been in groups where we've been asked to introduce ourselves, and some people go on and on, while others feel embarrassed, and nothing is ever done with that information. We feel that the time was wasted. Students should be encouraged to use each other's names, possibly with the help of a folded filecard on their desks or tables with their names in felt pen until they get to know each other better. Also, whatever information you ask them to share should be integral to the nature of your discipline and their roles within that discipline.

Class Formation

When possible, a circle is the ideal formation for whole class collaborative

discussion.

Potential benefits: Students can see the faces of all other students, can see their nametags, if they have them, and can interact more easily than with the back of someone's head. Traditional hierarchies of teacher at the front and students all sitting facing the teacher are broken down, providing opportunity for the corresponding breakdown of traditional teaching/learning interactions.

Potential liabilities: none in the activity itself, but if chairs need to be rearranged every time, it can be time-consuming, albeit time well-invested.

In lecture halls or in rooms with fixed furniture, frequent opportunities to talk over a new concept, or develop a shared hypothesis in pairs, or to write and share that writing with another member of class can contribute to a collaborative learning atmosphere.

Developing a discipline-specific discourse community with some shared metadiscourse

Whether our students are learning physics, writing, nursing, or dentistry, they need a shared vocabulary to begin talking about the concepts of the discipline. Or, if the vocabulary of the discipline is so esoteric that it will need to be introduced as part of the content of the course, you might want to learn what your students consider to be the root metaphors or governing paradigms or underlying principles of your course. The following activity has the benefit of developing a shared class understanding while providing opportunities for more students to meet each other early in the course. You will find this activity described in more detail in relation to a writing class in the following article.

Determine a significant feature of your discipline that you would like your class to explore, discuss, and come to some consensus upon -- it could be what constitutes A-level work in the course, or what your students think are the most important organizing principles of the discipline or particular subject area, or the most important characteristics of a genre or an era.

Have each student form a list of (five or so) principles or characteristics. Then, have them form pairs to agree upon one list of six principles or characteristics. Then have each pair team with another pair to agree upon one list of seven principles or characteristics. Then have each group of four pair with another group of four to discuss and agree upon one list of eight principles or characteristics. Next, have each group of eight pair with another group of eight to agree upon one list of nine characteristics or principles. Keep joining groups until you have one large group coming to consensus on one list of ten characteristics or principles. Have whoever has been keeping record of this list write it on the board or on acetate. Ask if anyone has a principle or characteristic left out that should be mentioned, add it, and open the amended list for more discussion. When the class agrees, then have them copy the list and make use of it throughout the semester in reference to the unfolding concepts of the course.

Potential benefits: students get to know what their fellow students consider important about the discipline, and learn whom they might like to work with in a

group setting. Students also make a significant contribution early on to the organizing paradigms of the course. Teachers learn early on what they students consider to be significant features or characteristics of an organizing paradigm of the course.

Potential liabilities: can be cumbersome with large classes. The students may agree upon something that is less important or more important than you envision it in the discipline (of course, you, as one member of the class, have a formative say in the evolving discussion; also, if something is left out that you think should be in, you have the same opportunity as each of your students to add it at the last).

As you have read through these pages, you have probably thought of several activities that you and your colleagues have used that would serve equally well or that could be modified. As you determine your opening moves for building a collaborative learning environment in your classroom, consider the following principles:

* introductory activities should be fairly brief;
* try to provide opportunities to mix with as many other classmates as possible;
* have activities integrally tied to the concepts of the course, and encourage students to discover and articulate those connections as part of the activity;
* use whatever is discovered or learned in these introductory activities in later course discussions;
* provide opportunities for students to discover or learn or articulate some features of the discipline that you could not wholly predict -- in other words, position yourself also as a participant-learner in these introductory activities, since you will be learning more about your students as they learn more about discipline-specific concepts.

The following article shows how a collaborative learning environment can be created in a writing classroom. However, as you will see, many of the principles and activities here are applicable to other disciplines.

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COLLABORATIVE CLASSROOMS: BUILDING A COMMUNITY OF WRITERS

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August 21, 1989 Journal Entry
I'm so intimidated by this class. I don't know anybody. We've been told we're going to have to read our papers to others in the class. I don't want to. I've done that before, and it's just a case of the blind leading the blind. I just want to do my own work, find out what you want me to do to get an A, and get out of here.
Lisa

December 2, 1989 Journal Entry
When I came into this class, all I wanted was to get an A. I didn't know about other kinds of goals. I didn't know about heuristics and revision. And I never realized how much collaborating with others in a group could help me to become a better writer. To become a better writer. That's my goal now. And I have to credit my group for starting me off on that goal. They told me what I did well -- I mean, I knew I was pretty good at description, but their support and comments encouraged me to work harder at it, to push for more interesting ways of writing things. But they also helped me with things I wasn't as good at, like punctuation and grammar, and sticking to a focus. I still would like to get an A, but that's not my most important goal. I want to learn how I can improve my writing so that I become a better writer, and if that earns me an A, that's great!
Lisa

Although some students look forward to sharing and talking about their writing in a collaborative setting, many others, like Lisa, are reluctant. Lisa's first journal entry of the semester mentions two of the most common reasons for this reluctance:

(1) students fear exposing themselves, through their writing, to their peers, and (2) students often feel that, since they are all in the same class, their level of expertise is so similar that they won't be able to help each other. The assumption that feeds this second reason is that only the teacher has sufficient knowledge to validate the student's writing. Lisa's first journal entry implies her belief in this assumption when she states her desire to find out what her teacher wants her to do to get an A.

As Lisa's freshman composition teacher, I was not surprised by her initial journal entry. Most of her concerns had been expressed by other students at the beginning of previous semesters, as well as by others in her class. I chose hers to begin this article because her first and last entries serve as articulated touchstones on her journey towards increased awareness of writing as a social act, with social contexts, social implications, and social consequences. I could as easily have begun with the following mirror image of this journey:

KATHY (a freshman composition instructor): What are we teaching in this research project anyhow? Are we teaching them how to collaborate? or are we teaching them how to write? (Aug. 15, 1989)

KATHY: Now I understand why you delayed answering that question. A year ago I wouldn't have understood your answer; now I wouldn't even pose the question. It's not a question of "either/or"; writing is a collaborative act of writer, reader, and a myriad of shared and evolving contexts. Collaboration is not one way to improve writing. Writing is, in its essence, a collaborative act. The research project helped me to begin to understand that. The ensuing year has reinforced it. A collaborative writing class is the only way to teach writing with integrity. My students prefer it, and I prefer reading the papers that benefit from it. (June 23, 1990)

A happy, productive journey for both Lisa and Kathy! Why, then, does collaborative learning and writing remain, in Anne Ruggles Gere's words, on the "margins of pedagogy" (1987)? Reither and Vipond (1989) offer two interrelated reasons: instructors differ in their understanding of the epistemological as well as pedagogical implications of collaboration and, as a consequence, often use collaboration within the framework of traditional curricula, syllabi, and activities. "Group work" and "peer-tutoring" then become as didactic and teacher-controlled as any traditional lecture, and students retain their dependence upon the teacher for determining and valuing their writing efforts. Lisa wrote, "I have to credit my group for starting me off on that goal [to become a better writer]" -- not her instructor, who was instrumental in establishing her group and enabling it to collaborate effectively, but her group! The instructor dominant in the phrase "find out what you want me to do to get an A" at the beginning of the semester has, by the end of the semester, become invisible.

The quality of this invisibility is a significant determinant of the effectiveness of collaborative learning and writing. As the invisible teacher in Lisa's class, and as the visible director of a three-year research project investigating collaboration in freshman composition classes, including Kathy's class, I made several trial-and-error moves before discovering and defining the nature of teacher-invisibility that can productively enable and enhance student autonomy in writing classrooms. Working with colleagues who were exploring collaboration in their classrooms, selecting from Elbow's and Macrorie's minimal intervention techniques (Elbow, 1973; Macrorie, 1979), Bruffee's more structured approaches (1985), Huff and Kline's group structuring suggestions (1987), and Elbow and Belanoff's smorgasbord of collaborative strategies (1989), I observed groups collaborating in all sorts of ways, listened to their talk, analyzed transcripts of audiotaped collaborative sessions, and read student journals and written texts. On the basis of my own classroom experiences with collaboration, observations of my colleagues' classes, and analyses of transcripts, journals, and student texts, my own pedagogical approach to collaboration began to evolve. Although subject to continual negotiations and modifications with each new class, the approach I have found most productive has at its core a communally-evolved metalanguage to generate and maintain ongoing dialogue among students and between students and their teacher. To determine its effectiveness, not only did I try it in my own class,

in which Lisa was a student, but also on an experimental basis with four instructors -- one of whom was Kathy -- each with an experimental class trying out this approach and a control class taught the instructor's usual way. By explaining this pedagogical approach to collaboration, I will try to show how Lisa and her fellow students developed the confidence and competence to help each other generate, explore, craft, and critique their ideas for written text, how Kathy came to see collaboration as an integral part of teaching/learning writing, and how I became invisible.

Autonomy Through Discourse: Establishing a Shared Metadiscourse About Writing

Kim: This is good. I really like it.
Barbara: I'm not sure. I really like it, of course. But the end seems to come too soon. I'm not ready for it. But I don't know how to tell you what's missing.

These two snippets from one freshman group's discussion of a paper are probably familiar to every teacher who engages students in group response. Less usual, but equally problematic is the following snippet that occurred early in the semester in one of my advanced expository writing classes:

Shawn: I'm too wordy. I know I am. Probably if I changed some of these subordinate clauses to participial phrases and absolutes, my emphasis would be clearer. Do any of you have some suggestions where I could make some of these changes?
Andy: I haven't a clue what you're talking about.I wouldn't know where to begin.

Both of these instances share a common problem: the lack of sufficient shared metadiscourse among students to help each other improve their writing.

David Bartholomae (1983) and Patricia Bizzell (1986) have both written of the importance of a shared universe of discourse for learning in educational settings, one that acknowledges and draws upon students' diverse discourse communities while initiating students into specialized academic discourse communities. Lev Vygotsky assumes a shared and common discourse when he writes of the importance of language in social contexts for moving through the "zone of proximal development" to new or deeper understanding (1962). Michael Polanyi writes of the rich reservoir of tacit knowledge we all have, waiting to be tapped through conversational and experiential prods and probes (1955). According to Noam Chomsky (1965) and Dell Hymes (1980), this reservoir of tacit knowledge includes an extensive understanding of language (Chomsky and Hymes) and of how language works in a wide range of social contexts (Hymes). And yet, what composition teacher has not faced the challenge of a silent class looking only to her as the fount of all wisdom and knowledge about language and writing? My problem, as a writing teacher, was to find a way to enable my students to talk about their written texts using their collective understanding about language and about writing. To impose my terminology and language values, or the terminology and

language values of an unknown textbook author, without acknowledging my students' knowledge of language and writing in their respective discourse communities would undermine the integrity of any approach to collaboration. The establishment, therefore, of a shared metadiscourse, based on students' views of what constitutes "good writing" and using students' language as much as possible, seemed an appropriate beginning for a semester of collaborative learning and writing. Working in small groups to determine qualities of "good writing" and then as a class to shape them into a statement that would be meaningful and agreeable to everyone in the class, we came up with the following:

OUR CLASS STATEMENT OF "GOOD WRITING"
Good writing
flows smoothly
moves coherently from one idea to another
is organized according to ideas and intentions
conveys the writer's vision to readers
understandably and interestingly
elaborates appropriately to develop
message/point/focus/stance/thesis/purpose
with appropriate
mechanics
invites reading
lingers in the memory
is honest, sincere, authentic,
sparks personal meaning: stimulates feeling and/or thought
has something that sets it apart, above the mundane:
alive
fresh
playful
surprising
unique
has impact!

Each word, each phrase was contributed, explored, and explained by members of the class, so that all students felt ownership in the discourse we agreed would form the basis for our semester's discussions about writing. Each student carried a copy, for easy reference when formulating writing goals and discussing each other's written texts.

Autonomy Over Individual Goals and Objectives: Group Histories

Susie: I want to get an A in this course. I want to write good essays (goal stated first day of class).
Syllabus: In this course you will increase your awareness of and power over your writing processes (objective 'c').

As teachers, we have long been indoctrinated with the importance of long term goals and short term objectives for covering curriculum content. We are also familiar with the disparity between the goals our students set for themselves and those we set for them. Only recently, however, since my intense involvement with collaborative learning in the past few years, have I begun to realize that setting goals

and objectives is not the exclusive responsibility of the teacher or some prescribed curriculum. I have seen the importance not only of clearly articulating to myself and to my students what my goals and objectives are, but also of students' clearly articulating to themselves, to each other, and to me what their goals and objectives are. Even more importantly, as Susie's goal illustrates, I have seen the need for students to learn how to formulate their goals in ways that will help them to achieve them. Wanting to "get an A" and to "write good essays" is an understandable but unhelpful goal unless Susie also understands the many intermediate and more specific goals she needs to articulate and achieve in order to achieve her more general goal.

With increasingly demanding curricula and course syllabi, class time needs to be used as effectively and efficiently as possible. George Hillocks (1986) points out that the most effective learning occurs in classrooms wherein there are clear and specific objectives or goals, writing problems or tasks that engage students with each other throughout different processes, and high levels of peer interaction concerning specific tasks (122). This environmental mode of instruction can increase student autonomy and commitment when students determine their own goals, decide how they might go about achieving them, and reflect upon their success in having achieved them. Group histories can facilitate this growing autonomy and commitment in collaborative classrooms.

Each writing group designs a folder wherein each group member records the following information, using the metadiscourse agreed upon in the class statement of "good writing":

a) (soon after completing the class statement) one or two major writing goals for the semester
b) (in the early stages of each paper) one or two goals for each particular writing assignment
c) a goal for each collaborative session (when the session is going to be a major part of the class period)
d) a mid-semester analysis of whether and how these goals are being met, and what the student might do if they are not being met (at mid-semester, students are given the option to form new groups)
e) an end-of-semester analysis of whether and how these goals were met.

All members of the group read each other's goals so they know what to focus on when helping each other, and also so that they have an idea of what others in the group perceive as writing problems. These group histories also contain the names, addresses and telephone numbers of all members of the group, so that they can arrange to call each other for out-of-class collaboration, or can contact absentees to let them know what transpired in class. The message is implicit but strong: students are responsible for determining what they want to achieve in the class; they are responsible for helping each other to achieve these goals; their instructor has confidence that they have the competence and motivation to fulfill these responsibilities.

I call these folders "histories" because they are documents of intellectual and social growth in the classroom community. Lisa explained earlier how her goals became more sophisticated as they acknowledged the intellectual force of social interaction while writing. Brian, another student in the same class, shows in his

mid-semester reflection a similar growth (even though he addresses his reflection to me -- it took a long time for me to become invisible to Brian):

> When you first asked us to write goals at the beginning of the semester, I didn't really know what you wanted. My goal was to get an A and write better. But now I see that you want us to determine for ourselves what we need to do to improve our writing and to become better writers. My goal now is to make every word count, especially my nouns and my verbs. My writing group helps me by pointing out vague or useless words, like thing and nice and boring verbs. I help myself by reading with more awareness of the words that professional writers use (October 16, 1989).

Autonomy Directing Reader Response: Questions to Initiate Group Discussion to Each Draft

Sam: What'd he say we were supposed to do?
Shelley: Check out the focus. Make sure we all have a clear focus. See here. Question 1 asks, "What is the focus of the paper?"
Bob: Okay, that's easy. What's the focus of your paper, Shelley?
Shelley: You're supposed to tell me, I think.
Bob: That takes too long.
(From a transcript of a freshman group, collected 3/17/88)

When I began working with collaborative groups, I used "peer response sheets" similar to the one that the teacher of the above group had given to his class. They seemed to chart a clear path through the chaotic labyrinth of students responding to each other's writing. The students dutifully and apparently cheerfully filled them out, giving the impression to me and sometimes to themselves, except when they deliberately subverted them as in the above example, that they were thoughtfully collaborating. However, when Sarah Freedman pointed out how peer-response sheets thoughtfully prepared by teachers can result in brief, trivial verbal exchanges that do not even begin to engage with the ideas or the crafting of ideas in students' written texts (CCCC, Atlanta, 1987), I began to pay more attention to what really was happening when students responded to questions that I (or another instructor) had prepared for them, and began to question their usefulness. On the other hand, Hillocks' study of classroom modes (1986) and my own observations and experience suggested that just letting the students "have at it" by responding at the intuitive, gut level can result in engaging chat, but not necessarily effective talk about crafting writing. I came to the conclusion that my students needed my guidance in building their repertoire of collaborative strategies, and their freedom to choose among them according to their specific needs.

Pat Belanoff and Peter Elbow (1989) have drawn together several kinds of collaborative strategies based on questions that evoke responses ranging from just listening to the text being read to describing particular features of the text to analyzing particular features of the text to critiquing and evaluating particular features of the text. In the early part of the semester, several of these strategies are modelled in a whole class setting, initially by me, but, later, as students become

more familiar with each other and with collaborating, by student volunteers. As students build their repertoire of collaborative strategies, they choose with the increased power of heightened awareness the kinds of questions that will provoke the kinds of response or assistance they require. Each new or revised draft presented or read to the group for response is accompanied by two or three questions formulated by the author, questions which indicate the growing control of the writer over his or her own writing concerns. That students can appreciate this increased authority and control is indicated in a comment made by Tracei, another student in that class, during a whole class discussion:

> ...becoming a better writer means you are more in control. It means that you know more about what you are doing and why you are doing it. It means that you know what you can do by yourself and what you need help for....It means that you know your work will be read by someone else so you have to make it fit your purpose and [the readers'] needs. And [it means] you know more about how to do that!

Autonomy Responding to Group Suggestions: Journal Reflections

John: My group wants me to end with the funeral, my friend's funeral. But I don't want to. What do you think?
Me: You ended with the funeral in an earlier draft, didn't you?
John: Yeah, but I felt so depressed when I reread it, and I don't want to feel depressed. We had good times. We did all sorts of great things together. I want to end on an upbeat note, on a good feeling.
Me: Did your group give you reasons for wanting to end with the funeral?
John: Yeah, and in a way I kind of agree with them. They say it's more dramatic, has a stronger impact, makes them more thoughtful about their own friends. I guess they're saying that it makes them think more when they've finished reading it.
Me: How are you going to decide what to do?
John: I thought you'd tell me which was better.
Me: Which do you think would end it so that your paper has the effect on your readers that you want it to have?
John: You mean, do I want them to feel upbeat or do I want them to think about what it means to lose a close friend?
Me: Those seem to be the choices facing you as a writer right now.
John: So I should just think about what I want - or rather what I want my readers to feel, and that will help me to make the right choice? Even if I go against my group, who are my readers right now?
Me: The decision is yours.
(Student conference, 9/15/90)

The debate triggered in John Trimbur's response (1989) to Harvey Wiener's

assertion that evaluation of collaboration should hinge upon the effective evolution of consensus (1986) highlights the dynamic interaction that can lead to learning in collaborative groups. Both Wiener and Trimbur agree that the process of achieving consensus can be important in collaborative learning, but they disagree on whether it is essential to effective collaboration and on what aspects of working collaboratively benefit from consensus. For example, procedural decisions usually require consensus or chaos could result. A focus for discussion might require consensus on particular occasions, and stylistic consistency on multiple-authored texts would benefit from consensus. However, responses to written text are, as Stanley Fish (1986) points out, so idiosyncratic that a call for consensus might easily silence a tentative, inquiring voice in the group while it enforces a more strident, dominant voice. Or, as the above conference with John illustrates, requiring consensus might relieve students of the crucial responsibility for making important decisions.

For these reasons, I ask that students write journals after each collaborative session. These journal entries react to the group discussion, elaborating upon which of the comments were most and least helpful, which the student might incorporate into the next draft and why, and which (s)he rejected and why. In this way, the writer remains in charge of the authored text, while articulating and therefore organizing and categorizing the kinds of suggestions that are helpful and the kinds that are not. For example, the complaint expressed in the following extract from Susie's journal was common, especially early in the semester, before students realize fuller roles for their collaborative groups:

> I wish they wouldn't just tell me about punctuation and grammar. I can fix that later. I want to know if they like my paper, and why they like it, or, if they don't, then what I can do to make it better. I want to talk about the bigger problems we talk about in class -- the focus, the development, and especially my use of language, because I'm trying a whole lot of different things with language (Susie, September 24, 1989).

To extend this growing awareness of the kinds of responses that might be more helpful, I suggest that students also reflect upon how helpful they have been to others in the group, and how their ways of helping have changed as the semester has progressed.

Control Over Teacher's Response: Letters of Transmittal and Response

The collaborative chain I try to forge in my writing classes has three interlocking links: whole class, small group, and student-teacher. I therefore want student writers to direct my responses to their writing just as they direct their group responses. Furthermore, much recent research has questioned the effectiveness of teachers' responses, suggesting that either students do not read them or, that when they do read them, they frequently misunderstand them. When students direct my reading of their writing, they have a vested interest in reading my responses, and, since they are the ones who have chosen the categories or areas of concern, they are less likely to misunderstand my comments.

Every composition handed in for my reading, whether it be mid-draft or final draft, is accompanied by a letter of transmittal that gives the following information:

a) goals for this particular composition (using the metadiscourse of the class statement of "good writing")
b) how the collaborative writing group helped the student to achieve these goals (or hindered him/her)
c) any particular risks taken, or worries, or features of the writing that especially please the student
d) directions on how the reader/teacher should read and respond to the paper; what, in particular, the student desires comments about.

After each composition, students write letters of response to my comments in order to maintain ongoing dialogue about writing using the metadiscourse established by and within the class. Because of the group members' contributions to the evolution of any written text, students are encouraged to include their group members' reactions to my comments as well as their own.

From Dialogue to Dialectic: the Final Frontier of Autonomy

Although this triple-tiered pedagogical approach to collaboration may seem at first blush to be highly prescriptive, it is intended primarily as a mechanism to enable students to take more charge over their writing goals, processes, and valuations. However, at the same time that it is a mechanism, it is also an ideological statement of a particular epistemology of writing. It asserts that writing is a context-bound, communally-evolved, socially-based act; that students have a broad, socially-shared yet idiosyncratic base of knowledge about language; and that, with some enabling teacher-interventions, students can draw upon their tacit knowledge of language to help each other write more effectively. The move from dialogue to dialectic parallels the move from a classroom that "does group work sometimes" to a classroom of collaborating students. For students to gain autonomy as true student collaborators rather than as teacher-directed peer groups, collaboration needs to be an integral part of learning and writing in every class period. When I asked Lisa why she thought that her experiences with collaboration in freshman composition had been beneficial, her immediate response was, "We do it every day." She went on to explain:

> At first, I thought, `Oh no, more wasted time,' when we started, but then, as we did it every class, and learned more about different ways it can help us with our writing, I began to look forward to it. And that's really saying something! I hate listening to somebody lecture for 75 minutes. This is so much more interesting, and helpful. If you had told me at the beginning of the semester we would be spending most of the class time in groups by the end of the semester, I would probably have dropped out and looked for a different section. Now, I don't know how I'll write anything once I lose the support of my group. We even meet to help each other with papers in other classes.

To Lisa, collaboration has become not an extra activity, to be done when there is time, or when her teacher thinks it might be a good technique for a change, but rather an essential part of her processes of learning and writing. She sees herself as

a qualified reader of her peers' papers, and recognizes the ability of her peers to help her respond to the needs -- and sometimes idiosyncracies -- of different readers. In echo of Kathy's statement that "A collaborative writing class is the only way to teach writing with integrity," Lisa sees writing as a social act with social implications and consequences:

> I never really thought before of someone actually reading my paper. Of course the teacher always did, but I mean a real reader. I never thought my writing could influence how somebody thought about something. But I loved it when Brian laughed at some things I wrote, and I was amazed when Chris got really angry at something I wrote about men. I love having an audience to read and respond to everything I write (Journal, November 2, 1989).

Has Lisa simply switched dependency on her teacher to dependency on her group? And, if so, where then lies her autonomy as a writer? It begins, I suggest, in her recognition that her peers have authority as readers of her work, just as she has authority as a reader of theirs. The authority previously vested in her teacher begins to be shared, a redistribution of the locus of power over making meaning and valuing written expression in the classroom. This redistribution of authority is aided in the pedagogical approach to collaboration I have just described by the initial valuing of students' views of what constitutes good writing, expressed in their own language, by the students' determining and formulating their own writing goals, and by the students' taking charge of authorial concerns in their writing, concerns that will arise out of their own writing goals, curricular goals, syllabus requirements, and reader reaction to daily writing, whether the reader be the teacher, a fellow student, or the student-writer herself. An end-of-semester class discussion about what it means to become a better writer allowed Lisa an opportunity to show the autonomy of her position as a writer in a collaborating group:

> I couldn't have done that [become a better writer] without my group. We laughed, we fought, we grumbled, and sometimes we even sloughed off, but we learned more from each other -- or, at least I learned more from them and I hope they learned from me -- than I ever did in a lecture class where we just handed finished papers in. When you told us on the first day that we were to think of ourselves as writers in this class [rather than as students writing], I thought you were pushing it too far. But, from working with my group I do think of myself as a writer now. And I see the world differently.

Notes

[1] A detailed report on this study, sponsored by the NCTE Research Foundation, has just been completed. Entitled, "Collaboration: See Treason -- A Three-Year Study of Collaboration in Freshman Composition Classrooms," the report is available by contacting the author of this article.

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EDUCATING COLLABORATIVE TEACHERS: A REPORT OF FACULTY RESOURCES

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Many instructors in higher education are increasingly valuing the social nature of learning as an integral part of active, engaged learning. Although much has been written about use of collaboration in the *college* classroom (e.g., Johnson, Johnson, & Smith, 1991; Cooper, et. al., 1990) little guidance is offered specifically to teacher educators. This paper offers examples of resources and materials to enhance collaboration in teacher education classrooms. The Educating Collaborative Teachers (ECT) project was designed to provide a guiding framework for the explicit teaching and modeling of interpersonal skills necessary to effective collaboration in teacher education. ECT draws heavily on collaborative learning experiences in a secondary methods course at Indiana University's School of Education. By sharing our experiences with collaborative learning, we hope to illuminate the practices of other teacher educators who are interested in integrating collaborative processes into their learning experiences, as well as identify some obstacles to implementation.

Collaborative Learning

Collaborative learning operationalizes the social nature of learning while capitalizing on active constructions of knowledge, multiple perspectives, ownership and voice. The roots of collaborative learning can be traced as far back as 1940's when Deutsch and Lewin proposed theories of cooperative and competitive situations (Johnson, Johnson & Smith, 1991). Vygotsky (1978) has written, "human learning presupposed a specific social nature and a process by which children grow into the intellectual life of those around them" (p. 88). Collaborative strategies necessitate extensive reliance on groupwork techniques.

Collaborative Learning in Teacher Education

There are two compelling reasons to use collaborative learning in teacher education. First, collaborative learning has been shown provisionally to be a more effective learning environment than more traditional modes of instruction (see for example, Rau & Heyl, 1990). If collaboration is more effective, then teacher educators have an obligation to both use it to the best advantage in their teacher education classrooms and also to arm pre-service teachers with the necessary skills to utilize such a powerful learning tactic. As a result of its increased usage, the underlying messages which are sent to students about groupwork at this level will be a powerful influence on their future teaching practice. Second, cognitive apprenticeship (Collins, Newman Brown, 1988) points to modeling as one of the primary modes of learner construction. Therefore, teacher education classrooms should foster collaborative learning experiences with the teacher educator functioning as a model.

The ECT Project--an Instantiation of Collaborative Processes in a General Methods Course

Project Roots

The ECT project was developed by Instructional Consulting and Research (ICR), an arm of the Center for Media and Teaching Resources, in collaboration with The Center for Adolescent Studies at Indiana University. The ECT project was designed for an undergraduate general methods course offered at Indiana University for secondary pre-service teachers. The ECT pilot version extensively encourages, models, and utilizes collaboration. The focus of ECT is on the interpersonal skills necessary for groupwork. This project did not seek to pre-specify everything that should happen in the classroom. However, ECT provides a structure that can be used as a starting point for teacher educators hoping to employ collaborative learning strategies.

ECT materials may be used in any course in which collaborative strategies are taught or used. Therefore, the overriding approach emphasizes interpersonal skills and modules into which any content might be integrated while maintaining the integrity of collaborative experiences. In this way, flexible "shells" for collaborative learning are available for instructors of various teacher education courses.

Project Development

The developers brought several skills to the ECT project including extensive working knowledge of collaborative learning principles and practices as well as extensive experience in instructional design at the college level. Prior to the ECT project many of these strategies had been piloted in the general methods and other pre-service courses.

Although the results of these pilot programs were available to ECT developers, a disciplined organizational structure that would facilitate the modeling and teaching of these strategies was not immediately apparent. Therefore, the first step in the development of ECT materials was identifying an organizational schema that would facilitate both the teaching and learning of social skills.

Several organizational structures were explored and shared with other experts in instructional design and collaborative learning. After several iterations, a schemata of interpersonal skills was identified. (See Figure 1).

CATEGORY	SKILL
Social	• Know names • Identify commonalities
Organizational	• Take on roles • Maintain cooperative responsibility to large group • Encourage participation by all • Summarize (agenda/process) • Integrate ideas into single position • Check group's progress • Set agenda • Assign tasks • Develop process: (e.g., action items, conflict resolution, governance, decision making)
Communications	
Conversational	• Stay in group • Use quiet voices • Take turns • Maintain eye contact • Do not display any socially offensive behaviors • Use effective listening habits • Share feelings and ideas • Display sensitivity to others' positions
Inquiry	• Ask for facts and reasons • Ask for help and clarification • Express support and acceptance of divergent ideas • Seek accuracy • Seek elaboration and examples • Probe • Criticize ideas not people • Explain and clarify • Extend answers
Conflict	• Be open about conflict • Understand others' positions • Check for consensus • Seek basis for lack of consensus • Express disagreement constructively • Seek higher level synthesis

Figure 1: Groupwork Interpersonal Skills

The interpersonal skills used in successful groupwork have been placed in three categories; social, organization, and communications. Social skills include those skills necessary to form relationships and to begin to build trust among group members (e.g., knowing people's names and identifying commonalities). Organizational skills focus on leadership and administrative skills that are necessary to keep a group functioning regardless of the group's task.

There are three subcategories within communications skills. First, *conversational skills* include listening, taking turns and sharing feelings and ideas. These skills are needed to keep the group on task. If one member dominates the conversation, the group will spend too much of its time and energy dealing with their negative feelings. Second, *inquiry skills* are fundamental to the success of groupwork. As individuals socially negotiate meaning and ask and answer their own questions, it is imperative that they are equipped with sufficient skills to probe for further information, seek elaborations, and accept divergent ideas. Finally *conflict resolution skills* enable group members to resolve any disagreements that arise. The more skilled the group is at resolving differences, the more time they will have to be productive, functioning teams.

Classroom practices

The necessary interpersonal skills are taught and practiced while students engage in group exploration of substantive issues. The evolution of the collaborative classroom has been graphically depicted in Figure 2.

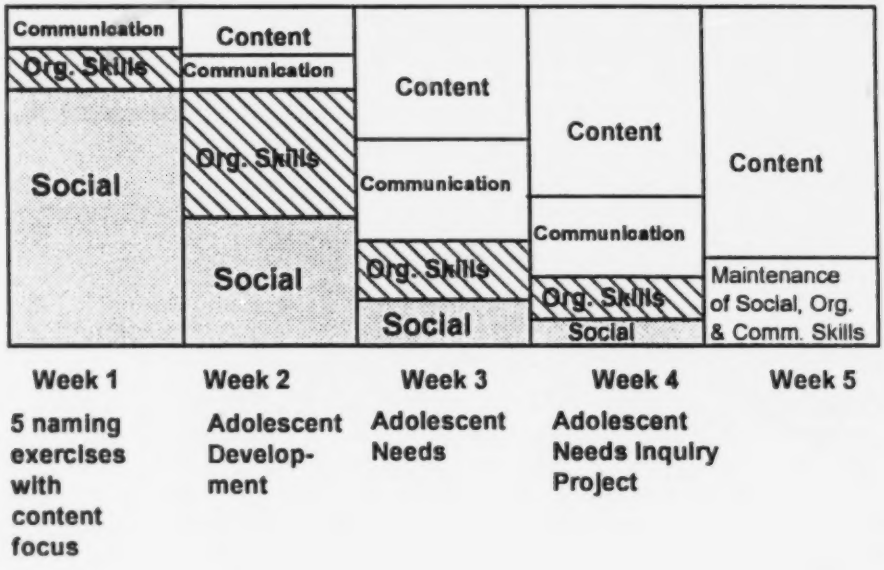

Figure 2: The evolution of a groupwork-based course

In the case of Figure 2, in the first week the emphasis is on building simple social skills which are necessary to build a foundation of trust within the class. Such social skills include getting to know classmates' names and common experiences. Although the diagram indicates an emphasis on social skills, these activities may include some content as well (e.g., students introduce themselves and *tell why they want to become teachers*). Sample content (e.g., adolescent development) has been included at the base of Figure 2 and is specific to the secondary methods course. As the weeks progress, the emphasis shifts from laying a strong social foundation to introducing subject matter and maintaining organizational and communication skills.

In the second week, the emphasis on names and commonalities decreases as most students can identify their classmates by name and recognize shared experiences. In these first two weeks, students have opportunities to work in a variety of group settings. The focus on organizational skills in the second week coincides with the formation of a core discussion group which serves as a permanent team for the rest of the semester. In teaching organizational skills, the instructor has the group identify certain people to play certain roles (e.g., facilitator, record keeper, spokesperson). These role assignments are shaped so that it is necessary for various team members to play roles to complete the task. At the college level, most students have already mastered conversational skills, therefore, much of the guidance is focused on inquiry and conflict management skills. Inquiry skills are taught by giving students examples of inquiry questions to guide their work on a project. As the group becomes more proficient at inquiry, they will be able to generate their own questions and strategies for finding solutions.

The diagrammatic representation of the evolution of the collaborative classroom (Figure 2) may seem to place undue stress on interpersonal skills. However, groups are fundamentally made up of people and all people are not equally skilled at interaction (Gardner, 1983). Consciously teaching and attending to interpersonal skills enhances the potential for successful collaborative learning experiences in teacher education classrooms. (Johnson, Johnson & Smith, 1991).

This highlights one of the difficulties of utilizing collaborative processes. The evolution of cohesive groups takes *time*. In the authors' experience, time is an issue in almost all collaborative learning experiences. Essentially, whenever students are actively engaged in learning experiences, there is likely to be a tradeoff between class time spent on content coverage, and time spent facilitating group learning experiences.

Several specific competencies were identified and refined during the initial stages of ECT development. After the interpersonal skill competencies were identified and the scope and sequence outlined, modules for each competency were developed. Each module included activity sheets to guide instructors through the process of using each groupwork skill in teacher education courses. Samples of such activity sheets and organizing schemas can be seen in Figures 3, 4, and Appendix A.

ECT Modules

Skill:	Activity Choices:
SOCIAL	
Know names	1,2,3,4
Finding commonalities	5,6,7,8
ORGANIZATIONAL	
Taking on Roles	9,10
Maintaining cooperative responsibility to large group	11, 17
Encourage everyone to participate	12, 17
Administrative/Leadership	13
COMMUNICATIONS	
Conversational	14
Inquiry	15, 17
Conflict	16, 17

Figure 3: Skills and Activity Choices

ECT Modules

Activity		Page
1.	Instructor modeling	05
2.	Name tags	06
3.	Seat alphabetically	07
4.	Introduce neighbor	08
5.	Double circle	09
6.	Living graphs	11
7.	Pairs--find commonalities	12
8.	Form groups by commonalities (e.g. month born)	13
9.	Dominoes	14
10.	Breaking into groups	16
11.	Broken Circles	17
12.	Talking Stick	18
13.	School Board Town Meeting Role Play	19
14.	Bad Group Work Simulation	20
15.	Building a T-Chart	22
16.	We All Scream for Conflict	23
17.	They will Never Take us Alive	24

Figure 4: Activity Table of Contents

The ECT classroom highlighted the content of a traditional secondary methods course as exemplars of how didactic content could be adapted to groupwork situations. The ECT classroom was unlike many traditional education methods courses where lecture modes and transmission models of human learning prevail. Several practices which are consistent with collaborative theories of learning are outlined below to give a sense of actual classroom implementation. Included in this discussion are the results of anonymous written and interview data collected as part of a faculty development project administered by a representative of ICR from students to gauge their reactions to this non-traditional approach to secondary methods instruction.

Modeling

In the ECT classroom, the instructor clearly modeled good groupwork practices as a teacher (Comeaux, 1991) and also made the students aware of her decision making processes through "theatrical asides". Such modeling practices are consistent with the cognitive apprenticeship theory (Collins, Brown & Newman, 1988) of learning. These reflections often included discussions of the relative advantages and disadvantages of instructional alternatives considered. The instructor often discussed why she selected one activity and how it met a particular student need or instructional goal. For example, when one student began to dominate the discussion in two consecutive classes, the instructor used an activity required no person to speak a second time until all in the group had spoken[1]. She then reflected to the class why such activities can be helpful to the collaborative processes.

One student interpreted these reflections in this way,

> *...I have learned some very valuable teaching methods and also many "tips of the trade." I think these little do's and don'ts have been one of the greatest assets of the course.*

Another student testified to the value of modeling reflections,

> *The variety of activities and the why of their uses makes the class one of the few that I will refer to in the future.*

Immersion and Authentic Learning Environments

Placing students in realistic environments full of all the complexities that they will actually face as teachers facilitating groupwork in their classroom is essential to effective uses of collaborative learning. In the ECT classroom, collaborative learning was embedded in authentic activities. Microteaching and fieldwork were integral parts of the course. As with many such experiences, some of the students had opportunities to experience collaborative learning models in the field and microteaching experiences, while others preferred or were relegated to less authentic environments. Some of the more positive student reflections on these experiences include:

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[1] This activity is listed in Figure 4, #12. Talking Stick. Further information on this original activity is available from the authors.

I learned some useful, practical ideas and techniques that I will definitely use in my own classroom. I found the microteaching and practice teaching exercises especially helpful.

The subject matter is important. I like the way that the subject is emphasized in real situations.

The immersion technique (Prawat, 1991) was used during the first few weeks of the course. In this approach, the principles of interpersonal skills are *not* made explicit. The content of the course was framed so that students were *immersed* in groupwork activities as they *learned* about groupwork. In order to best learn about groupwork--what it feels like on both the part of the teacher and the student--it was necessary to immerse students in real, functioning groups. Students in the ECT classroom were also asked to take on the role of the "teacher" in various groupwork activities throughout the semester. This gave the students an opportunity to *live* their future role as groupwork facilitators.

Several issues emerge from such experiences. Students recognize the difficulty and the special logistical issues which arise as a result of implementing groupwork in their classrooms. Such issues are commonly invisible to pre-service teachers until they try new methods out in a classroom. The organizational skills activities identify several group roles (e.g., facilitator, spokesperson) that mirror activities teachers perform in public school classrooms. Frequent presentations of group findings give pre-service teachers practice in organizing and presenting material--just as they will have to in their own classrooms. One student puts it this way,

I liked the learning as we were <u>in class</u>, not just learning about methods, but being involved as the style or method was in action. I like the group activities constant(ly) learning about <u>exactly</u> what our lives (teaching) will be in the next year or so.

Another student clearly shows an articulate understanding of the pros and cons of groupwork as a result of immersion processes used in the ECT classroom,

(The instructor) really makes it exciting and interesting to try new ways of doing groupwork. Groupwork was not an avenue I had previously considered using often, so this has really opened up somewhat for me; although I still see some personal and logistical drawbacks to using groupwork.

<u>Interpersonal Skills</u>

The ECT project focused heavily on the interpersonal skills necessary for effective groupwork. When an instructor chooses to use groupwork in a college classroom, some attention must be paid to the level of interpersonal skills the students bring with them to this activity. Without these interpersonal skills, the group learning experience will be less than successful and may even be detrimental to individual students or to the entire culture of the classroom.

<u>Activity Sheets</u>

The activity sheets (See Appendix A) were used to guide several class sessions

during Spring, 1992, and were viewed as equally effective in the college classroom and the secondary classroom. As such, it was useful to share the activity sheets with the pre-service teachers to strengthen their preparation in applying these activities to their future classrooms. One student's reaction articulated an apt description of uses of these activities with his future German students. In an unstructured interview, the student described an appropriate application of the Double Circle[2] (Pfeiffer, 1989) activity in his future classroom.

> *I will be using groupwork a lot. For example, the Double Circle and some of the distraction activities--the warm ups, I can see using those for language and vocabulary building. With the Double Circle, they could ask each other questions and this would really help with their conversational skills.*

Classroom Culture

The activity sheets represent the explicit planning and teaching of social skills. As such, their application led to a positive classroom culture and climate. One student reflects,

> *I have fun in this class because the instructor has made the classroom so comfortable. The students participate and work together. I feel as if they are all my friends.*

In addition to the explicit attention paid to interpersonal skills, the instructor's attitude and instructional methods contributed significantly to this positive, accepting, classroom climate.

> *I really like the attitude that (the instructor) has toward teaching and the methods she uses to introduce material to the class. You always know when you come to class it will be fun. Our class is like a big family and I think that is important in order for us to maximize our learning potential.*

Obstacles

A variety of obstacles are inherent in the application of collaborative learning principles in the teacher preparation classroom. These obstacles can be categorized in three broad areas: curricular design, implementation, and evaluation.

Design

Interpersonal skills is an ill-structured domain. It is difficult to develop a conceptual model with clear categories of social skills necessary for collaborative learning. During the design effort, we drew on models from various writings on group theory and collaborative learning (e.g., Johnson, Johnson & Holubec, 1991; McGuire, 1987; Rose, 1987). The organizational structure (See Figure 2) reflects

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[2] This activity is listed in Figure 4, #5. Double Circle, and is also included as an exemplar activity sheet in Appendix A and is based on the activity titled, "Circle-to-Circle Ice Breaker in The Encyclopedia of Group Activities, Pfeiffer, J.W. (1989).

an eclectic approach to defining this domain.

Predicting the chronology of events in a course such as this one is difficult. Some interpersonal skills, are easier than others to identify, teach, and schedule. For example, in the ECT classroom students must first learn one another's names. It is easy to anticipate and plan for this learning with an activity early in the semester. However, another important interpersonal skill that presents problems for scheduling is conflict resolution. In the pilot ECT classroom, conflict arose on the seventh week, but it might arise earlier or later depending entirely on the group. In order to deal with conflict in an authentic manner, it should be embedded in true conflict arising from class or group experiences.

Because of these requirements, the course must remain flexible and the schedule must be continually revised in collaboration with students. This can be very uncomfortable for both the instructor and the students.

> *This course needs to be more organized! I never seemed to know what was due from week to week because the syllabus was always changing and because the activities and assignments were added suddenly as the semester progressed.*

What is viewed by some students as disorganization is viewed by others as flexibility:

> *I like this course in that it gives us insight into different ways of presenting material, brings up questions we all have and deals with them. She also changes the format to what we need or what we request as extra explanation (i.e. speakers).*

To accommodate this need for flexibility, the structure used to design the ECT activity sheets was one which allowed for instructor selection from among a number of exercises (See Figure 3).

In addition to the need for flexibility, it was discovered during the course of designing the ECT classroom that as a result of the need to engage learners in the social negotiation process, each activity took more time than lecture presentation of content. This necessarily meant that fewer activities were selected and their associated content was dealt with in-depth. In essence, a trade-off of depth of content for breadth of coverage was the result. Essentially, we identify process as content. For example, in a recent U.S. history design project, we moved away from the traditional conception of U.S. history as names and dates, preferring to emphasize process skills such as inquiry, synthesis, and application of historical data to authentic learning tasks.[3] Through these experiences, we have found that it

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[3] Results of US history curriculum design efforts, Indiana University, Multi-Media Lab projects:

Lockermedia, 1991, Brescia, W.; Carr, A.A.; Chen, P.L.; Garfinkle, R.
Perspectives '48, 1991, Brown, B.F.; Choi, W.; Goldstien, L.; McMahon, T.A.
TruMedia, 1991, Chong, S.M.; Fishman, B.J; Honebein, P.C.; Kim, Y.

is necessary to let go of the traditional conceptions of content.

Implementation

Several impediments to the implementation of collaborative learning in college classrooms today can be identified. Even with the assistance of the activity sheets that the ECT project provides, instructors espousing such beliefs about the way their students learn must be prepared for certain obstacles. The ECT classroom requires different attitudes and behaviors of the instructor. First and foremost, the instructor must spend increased amounts of time in preparation. While collaborative learning on the surface may appear easier (e.g., "I don't have to prepare any lecture notes"), employing new instructional methods always requires an initial time investment. In addition, instructors must be able to accept higher levels of ambiguity in almost all facets of the classroom experience and have familiarity with a wide range of solutions to problems that may arise.

Students must also be prepared for a very different classroom experience. They should expect to be engaged in their own learning. This requires an *active* role where many have been accustomed to passivity. The time required to actively construct and socially negotiate their understanding may be significantly greater and generally work cannot be put off to the last minute. With groupwork, scheduling times for groups to meet becomes an additional burden for some. Finally, students lose control of deciding when they want to actively construct their learning. They are required consistently to demonstrate active learning in the classroom--not the residence hall on their off hours, at their leisure. Habits such as skipping classes and copying notes from other colleagues are not productive in groupwork learning environments.

Students are not prepared for such demands to be placed upon them when they enter a secondary methods course the first day. They are prepared for a transmission model, competitive classroom similar to most of those they have experienced before. This unpreparedness only contributes to initial student discomfort with the active learning process and particularly with the collaborative learning model. In many cases, students are likely to feel disoriented or perceive the course as unstructured:

> *...I find myself lost and sometimes totally out of touch with what is going on. ... The instructor is a good speaker and mediator, but I am not clear in understanding what her expectations are.*
>
> *Also, I was a little overwhelmed by so much groupwork--sometimes it's nice to work individually. Not always, but sometimes!*

There are some students who simply have a very negative attitude about groupwork. One student voices his dissatisfaction, "...I simply hate working in groups." Possibly based on negative experiences in the past or lack of sufficient interpersonal skills, these students are one of the most difficult obstacles to implementing collaborative learning. In addition, there are some students who feel that the instructor should be the source of knowledge and power in the classroom and that there is a "right" way to teach and learn.

One student reflects this perspective, "I really don't know what is expected of me 100% of the time. I never can tell if I'm doing what is right." They may resent the abdication of responsibility for their learning on the part of the instructor. Essentially, these are attitudinal problems which call for instructor sensitivity, explicit discussions of such issues and motivational strategies (Keller, 1983). Consideration for the major categories of motivational strategies such as Attention, Relevance, Confidence and Satisfaction (ARCS) are central tactics for countering negative attitudes.

Evaluation

Student evaluation of instruction, and instructor evaluation of student performance both represent significant challenges in the ECT classroom. First, because collaborative classrooms are significantly different from traditional ones in both process and content, it is necessary to use different course evaluation instruments and strategies. For example, a typical teaching assessment by students instrument asks students to rate, "The instructor's explanation of the objectives for each class session and learning activity" (Clinic to Improve University Teaching, 1974). Such items represent a traditional view of learning and instruction. It would be inappropriate for instructors in collaborative classrooms to elaborate each objective when it is impossible to pre-specify learning outcomes since each student constructs his or her own knowledge in collaboration with peers. Therefore, we must seek out and develop different assessment instruments and strategies to determine the effectiveness of collaborative learning efforts.

Evaluating student performance can also be problematic. One may ask why the instructor has the right or responsibility to judge the content of student collaborations as a result of their course. This perpetuates the power dynamics currently in place in classrooms. On the other hand, in so far as there is something that instructors hope their students will gain as a result of being a member of their class, it is necessary to measure each student's accomplishment of broad educational goals. More specifically, it may be said that collaborative learning experiences imply assessment of process not product. One approach to student evaluation in the realm of groupwork is to include individual and group accountability measures (Johnson, Johnson, & Holubec 1991).

Conclusion

Collaborative learning is an effective method which we must share with our pre-service teachers both as a method for learning and for teaching. However, the implementation of such an instructional framework has vast implications for classroom practice. The development of tools to aid the instructor in this project has great potential for facilitating the learning of the interpersonal skills important to groupwork.

In addition, the project highlights a number of significant issues associated with the use of collaborative learning in teacher preparation. It is imperative that instructors initiating the use of collaborative processes in teacher education be aware of the design, implementation and evaluation issues inherent in its use. In order to most effectively fulfill the highest ideals and goals of teacher education, we must employ excellent tools as well as re-design the curriculum to reflect multiple

perspectives, collaboration, and authentic learning environments *throughout* the pre-service teacher's experience at the university.

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Appendix A:
Activity Sheet Examples for ECT Classrooms

Double Circle
Objective: To become acquainted with one another and to allow the students to explore both verbal and nonverbal communication.
Preparation: Be prepared for a noisy classroom!

TIME	ACTIVITY Double Circle	MATERIALS
2 mins. 5 mins. 5 mins. 30-35 mins.	Divide the class into two groups of equal size. Request one sub-group to form a circle in the center of the classroom facing outward. Ask the other sub-group to form a circle around the first group, facing the members of the first sub-group so that each person has a partner. (NOTE: If an odd number of students are in your class, your might join one circle). Explain the activity to the students telling them that the students in the inner circle are to remain stationary while those in the outer circle move one person to the right when asked to "move." Tell the students that you will ask them to greet each new person in a different way and ask them to follow your directions carefully. Give the following directions until the students are back with their original partners asking them to "MOVE" after each bulleted item: • Take your partner's hands, make eye contact, communicate something nonverbally, and then say good-bye nonverbally. • Each of you complete this statement; "What I like best about Bloomington is..." • Each of your complete this statement; "My favorite High School or Middle School teacher was..." • Each of you complete this statement; "The best place in Bloomington to get pizza is" • Each of your complete this statement; "One of the things I like best about myself is..." • Each of you complete this statement; "My dream vacation is..."	

TIME	ACTIVITY "Double Circle"	MATERIALS
10-15 mins.	• Each of you complete this statement; "Teaching is..." • Each of you complete this statement; "Kids are..." • Each of you complete this statement; "The topic I know the most about is..." • Each of you complete this statement., "The main quality I look for in a teacher is..." • Each of you complete this statement., "I am happiest when..." • Each of you complete this statement., "The thing that excites me most about teaching is..." • Each of you complete this statement., "My weakest point is..." • Each of you complete this statement., "I am afraid of..." Lead a debriefing discussion which could include questions like: ? What was the noise level like in this room during that activity? And what does that tell you about groupwork (i.e., you may get into trouble with your principal--is it worth it?) ? How did your feelings change throughout the activity? ? Which statements seemed most meaningful to you and why? ? During which part of the encounter did you feel most comfortable--the greeting, the conversation, or the parting? ? How did you react to the nonverbal communication and why? ? What can a brief encounter like this communicate about someone? Or other relevant questions of your choice.	

Evaluation: You should notice increasing facility with interpersonal exchanges as the activity progresses. The debriefing discussion should also be a place where you can see students displaying thoughtfulness about groupwork and the way they felt about the activity.

Figure 5: Sample Activity Sheet (p. 2)

Talking Stick

Objective: To promote participation by all, and socially appropriate group behavior.

Preparation: For this activity, you will have to make up several "Talking Sticks". They should be simple painted sticks (dowels will do) preferably brown with colorful Native American symbols painted on them. If possible, attach leather ties and/or feathers to the sticks. You should make between 5 and 8 sticks depending on the size of the class and the size of the groups you choose to use.

TIME	ACTIVITY Talking Stick	MATERIALS
3 mins. 7-10 mins. 20-30 mins. 10-15 mins.	Have the students get into groups of four or five, sit on the floor in circles. Explain that each group is to discuss their memories and feeling about *their* experience as an adolescent in this group. No one is required to tell anything that makes them uncomfortable, but can discuss their experiences, or those of a friend or family member during that difficult time. Give each group a "talking stick." Explain that the person who holds the stick is the one who is allowed to speak and no one else. This is built on an old Indian tradition of governance and group consensus. When a person has finished what he/she wants to say, they are free to give the stick to someone else. No one may *TAKE* the stick, however. No one may speak twice until everyone in the group has had the talking stick at least once and has taken part in the discussion. Emphasize to the students that it is important that they do not talk over one another or interrupt each other. This activity is about taking turns and socially acceptable modes of communicating in groups. Facilitate the group work by walking around the room, ensuring that each group is indeed following the rules of the activity. Accept the stick if a group offers it to you and model appropriate behavior for the group, disclosing some aspect of your experience as an adolescent. Debrief the group by asking them to reflect on the group process. Was it hard not to interrupt? Were there times they wanted to *take* the stick and were frustrated or forgot what they were going to say? Are there advantages/disadvantages to working in a group this way? Such as?	Talking sticks (see preparation section)

Evaluation: You should observe positive, polite interactions among the groups.

School Board Town Meeting Role Play
Objective: To encourage good leadership skills in students.

TIME	ACTIVITY School Board Town Meeting Role Play	MATERIALS
3 mins.	Divide the students into groups of four or five, and ask them to identify a leader/representative who will represent the group's opinion to a task force later in the activity, a recorder, and a timekeeper for the group.	
5 mins.	Explain that the student groups represent different factions of a community and have to make a decision about a funding proposal (See attached). The small groups are to quickly come to consensus and then send a representative to the center "School Board" meeting.	
7-10 mins.	Allow the students to discuss their position on the issue of the funding given them and to come to a consensus.	
15-20 mins.	Ask the leaders from each group to come to the center of the room and sit in a circle. The task is for the School Board of elected representative to decide how the money will be spent. The leaders should represent the interests of their original group, but can make concessions in order to come to a final consensus.	
10 mins.	Debrief the students by discussing the group processes in both the small groups and the School Board meeting. How did the leaders represent/not represent the wishes of their original group, how did that make the group feel? How was consensus reached in both the small and School Board groups? How could the process have been improved? What skills have we talked about/practiced in this group that you saw used in this exercise?	

Evaluation: You should observe effective conflict resolution in the groups both small and school board.

COLLABORATIVE LEARNING AND EVALUATION

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Introduction

Those of us who are looking to the suggestions of our colleagues within this source book are already considering our teaching in a new light. Supporting students working in collaborative groups is not necessarily simple. It is much simpler to stand in front of students and transmit the information that "covers" the territory of a course. It is much simpler to devise standard tests that can be used year after year or to enter test grades scored by computer. Not only is it easier, students take less exception with the assessment we offer or the grades we give. In fact, one characteristic of a transmission model of learning is a perceived authority, both in the content of the course and in the instructor's power, that few students are willing to challenge. The decision to move to a more transactive view of learning often represents a shift in our beliefs about knowledge, values, and human action.

These issues will be discussed briefly in this introduction. We then share several examples from actual classrooms as a way of highlighting issues of concern when instructors evaluate students' collaborative work. And finally, we offer some working drafts of evaluation strategies and recording devices that have been shared with us.

Mechanistic vs. Organic World Views

A "mechanistic" view of the world represents knowledge as fact. It underscores the belief that the content of our respective disciplines can be unequivocally determined and separated into parts, into courses, the whole of which add up to the knowledge we (or knowledgeable colleagues like us) determine our students need. Instructors then distribute that knowledge through lecture, reading, and assignments. The students receive the conventional wisdom and offer it back for our grading. The process is efficient, easy to manage, and easy to evaluate (Neilsen, 1989).

Yet we all pay a price. As educators we complain that some our students are compliant rather than independent and inspired learners. Learning might be translated into cramming for tests, copying others' lecture notes, or doing "enough" to pass. Further, if we equate high scores on tests with the degree of in-depth learning that has occurred, we may be fooling ourselves. Not only may our students have, at best, a superficial understanding of the information essential to our respective disciplines, we have also failed to engage them in the real work of biologists, auditors, or English teachers. As professionals, we engage in knowledge construction by grappling with everyday problems. Our own research issues concern the anomalies that surface as we actively engage in the practice of our disciplines. Seldom are we involved with indisputable facts or simple answers to complex issues.

Knowledge viewed from this second perspective, what some call an "organic" world view, is a result of our encounters and interactions with the world. While

few of us would disagree that there are "facts" we need that are more readily memorized, the most powerful knowledge is that which we actively construct through inquiry. Specific content is often of less importance than the ability to pose significant questions and pursue those with other interested learners. The aim of teaching then shifts, with greater emphasis placed on the development of strategies, judgment, and self-assurance that will support students in both current and future endeavors.

Evaluation as an Extension of a "World View"

It follows that instruction organized around "knowledge as fact" is more easily and objectively evaluated. Students have the knowledge, or they don't. Evaluation is an issue of assigning specific grades to accrued knowledge. We leave this firm territory when we view knowledge from a more organic perspective.

Creating opportunities for students to both create and display new knowledge is a challenge. Students' efforts often reflect the success of our own assignments as much as they reflect what students may or may not have learned. The examples from actual assignments that follow begin to tap the multitude of issues involved. How to assign grades is only one consideration. Others include creating assignments that truly endorse and build on multiple perspectives, recognizing the varying contributions of group members, the efficacy of grades, and how we all can learn from this relatively recent inclusion of collaborative learning in our university classrooms.

SELECTED EXAMPLES

EXAMPLE I

Course: English, Writing in the Disciplines
Instructor: J. Campbell

Assignment: Working in groups of three, students establish a question or concern of interest, prepare a survey to gather information from the larger community, conduct the survey, interpret the results, and prepare a report in which the information is presented.

Considerations:

- Choice is important.
- Assignment endorses multiple viewpoints and students genuinely need the help of others to figure things out: conducting the survey allows them to divide the labor; interpreting the data is enhanced by students sharing various perspectives.
- Students select their own groups; in this way they are responsible for the choice of who they work with and don't focus responsibility on the instructor when group members may not contribute.

Assessment: Each report is given a single grade by the instructor. All group members receive that grade.

Considerations:

- This grading policy more closely reflects real world situations in which students will later be engaged.
- Students can take responsibility for group members' contributions to the project.

Insights:

- Students often have legitimate conflicts or constraints (schedules, personalities) which make collaborative work difficult. Although collaborative assignments are regularly given, students who elect to work alone may do so. This usually means 3/4 of the class work happily together in groups while 1/4 of the students complete the assignment alone.

- Instructors unfamiliar with collaborative assignments can be encouraged and supported in developing them. Those willing to set aside initial hesitations (i.e. poorer writers will get higher grades than they deserve), often see the value of collaborative work in a whole new light.

EXAMPLE II

Course: Language Education, Learning Skills
Instructor: C. Beverstock

Assignment: This assignment is given approximately two-thirds of the way into the semester. At this point in the course students have completed studies into at least several issues of interest: i.e. time management, note-taking, etc. The instructor provides opportunities for them to share among themselves some of their current thinking and interests. From this discussion and the resultant charting of interests, students form themselves into groups of 4-5. Their first task is to conduct a conversation in which each shares the most significant insight or learning gained during the course. From this discussion, each group plans a presentation in which they communicate these insights by actively involving all class members.

Considerations:

- Students form interest groups based on learning from the class.
- Students build their own presentations from the demonstration of various possibilities the instructor has presented herself.

Assessment: The students are evaluated by their peers on a scale of 1-5, noting how successfully the insights have been communicated and the degree to which the class as a whole has been actively involved in the presentation/activity. The instructor does not assign a grade, yet takes detailed notes on each student, his/her role in the overall group endeavor, new insights students have gained, etc. These notes help determine the final grade: students who play active roles within their groups and whose grades are not yet determined, receive the higher grade.

Considerations:

- Students within the class have grown in their ability to more critically

evaluate the performance of their classmates.

Insights:

• It is abundantly clear which groups actually participated in a conversation. This is evident both in the content of the presentation, as well as in the roles students play.

• Commitment to this assignment closely reflects individual students' growth during the course of the semester.

EXAMPLE III

Course: Education, Methods of Teaching Reading
Instructor: K. Egawa

Assignment: Students choose an adolescent novel to read from a selection of several which have been briefly introduced. As they read, students are asked to use post-its to note places in the text that catch their attention or raise questions. During the following class meeting, the post-its are used to begin a conversation among the 4-5 students who selected each novel. The initial direction of the conversation is established by each group; later, each group is asked to map out, on a single sheet of paper, themes or issues that could be pursued if they were to spend more time discussing the book together.

As half the groups begin to discuss their novels, the other class members quietly move between the groups, listening in on the conversations. These students note on post-its what they hear good readers doing: i.e. good readers are excited to read and discuss things they like; good readers support their ideas with specific examples from the text; good readers aren't quick to be critical -- they keep an open mind toward others' interpretations. The post-it comments are placed on a large sheet of paper mounted on the wall. The comments are organized into tentative categories by several other class members. Groups then reorganize to alternately discuss or listen in.

The synthesized list of "What Good Readers Do" is the first "text" in a course designed to consider theories of reading and reading instruction.

Considerations:

- Choice is key. Most students are able to select a novel that is of personal interest.
- All students are readers, discussants, and participant observers.
- The use of discussion strategies, such as post-its, allows the instructor to quickly note which students are prepared.
- All students play an active role in generating and constructing knowledge about the reading process.

Assessment: Specific grades are not given for this collaborative engagement. It was designed to allow students to participate with a minimal degree of pressure or coercion, to allow all students to contribute to new information that builds from

their own experiences and observations, to highlight that we all, as "good" readers, know a lot about the reading process, as well as to allow the instructor to move among the students and assess their involvement.

Students subsequently use this "text" to consider the texts of other reading theorists. In this way, they are able to assess the value and relevance of their own knowledge in relation to professionals in the field of literacy. This information, taken together, forms the basis of the midterm assignment: an essay on three insights into the reading process.

Considerations:

- Over time, the most important assessment is self-evaluation.
- Grading isn't always essential to assessing student involvement and contribution.
- Students are quickly able to see the significance of their contributions.

Insights:

- All students bring knowledge and experience to contribute to our courses. Although that knowledge might not initially be accessible, through carefully conceived engagements, *all* students can become contributing members of the class.

- While it is sometimes more difficult to conceive of engagements in which students generate *new information or new configurations of information*, such engagements contribute to the learning of all participants.

- The generated information is always greater than what any *one* participant, the instructor included, could generate. In this way, as with the first example, such assignments endorse and necessitate multiple viewpoints.

EXAMPLE IV

Course: Education, Methods of Language Arts Instruction & Methods of Reading Instruction
Instructors: B. Berghoff, K. Egawa

Assignment: This assignment constitutes the major course requirement (courses are team-taught). Students organize themselves into groups (recommended 3-5 members) to inquire into a topic of interest. Working from an inquiry cycle model (Burke & Short, 1991), group members:

- establish a focusing question or individual questions relating to a focused topic;
- share their relationships to that question(s);
- document what they already know;
- list possible resources;
- research;
- prepare a 45 minute group presentation for other course members;
- individually write a document (i.e. letter to the editor, conference presentation, letter to prospective employer, etc.) using the information

the group has generated;
- individual documents are bound as a final class text;
- reflect on the experience.

Considerations:
- We each share a personal relationship with our topics of interest.
- Extended collaborative work most profitably builds upon topics of mutual interest.
- Both group and individual "products" can result from collaborative endeavors.
- All learners gain from the research of other course members.

Assessment: The initial assessment of the inquiry projects comes from class members. In groups of two, they are asked to respond to the presentations of their classmates by listing "three plusses and a wish" (Mills, 1986): on note cards twosomes share three things learned from or appreciated about the presentation, and one suggestion for improvement. The cards are given to the individual groups and group members are given a chance to read over them. The following class session each group member fills out an evaluation form (see Form A). This form asks them to consider their work together as a group, as well as to assess their own personal contributions to the group. The instructor then uses these assessments, in combination with her own comments, to give written feedback to the group (and/or individual group members as needed).

As learners work through an "inquiry cycle," opportunities are taken to reflect on successes and suggestions for further inquiry. Rather than assign grades for initial efforts, learners are supported in considering how they might build upon their successes and failures as they consider future inquiry projects. Individual reflections, considered with the rest of a student's work over the semester, form the basis for the instructors' negotiated grades with each student.

Drafts of written documents are occasionally read by class members using a strategy entitled "Read Around" (Gossard, 1989). In groups of five, learners quickly read a group of five coded drafts, noting the code number of the one they felt most compelling or outstanding. These are passed on and another group of drafts read in similar fashion, etc. Groups later share the coded numbers of the chosen drafts. Papers chosen by more than one group are identified and the authors invited to share their papers aloud. Following the readings, class members develop a rubric which lists specific successful features, i.e. descriptive language, humor, well-developed argument, etc. The rubric can be used as a basis for both revision, and/or evaluation of the last, more formal draft.

Considerations:
- All class members share an ability and an obligation to evaluate each other's work.
- Learners are often aware of their own successes and shortcomings; all assessment begins with self-evaluation.
- Each demonstration of an assessment or evaluation procedure serves to inform pre-service teachers' own future practice.

Insights:

• Individual class members' abilities and performance vary depending on the configuration of the groups in which they share membership; some groups work together more successfully than others. There are often key class members who contribute to the success of each group they work within.

• Group and self-evaluations often reflect the instructors' same issues of praise or concern.

• Although grades remain a primary concern to students, group and self-evaluation provide meaningful feedback. Evaluative comments become successively more direct, as well as supportive.

EXAMPLE V

Course: Anthropology, Topical Seminar 400/600
Instructor: B. Kendall

Assignment: This assignment constitutes the major course requirement. Everyone in the course prepares a seminar presentation, either individually or collaboratively, on a topic of concern raised in the seminar/readings. Based on this research, everyone again, both individually or collaboratively, produces a paper. The instructor is available for consultation regarding topic, perspectives, and/or potential resources. Emerging topics of interest are discussed in class so students with similar interests can identify each other. Several course sessions are set aside for groups to meet and discuss their presentations/papers.

Considerations:
- Choice of topic is important.
- Students choose whether to work collaboratively or individually.

Assessment: All students who participate in the seminar are given a grade of "A" for the course. The instructor's emphasis and concern is that the seminar will assist students in reorganizing their thinking in the direction of clarity and understanding, as opposed to producing an error-free term paper of a specific length. The presentation is an opportunity to share present thinking.

The instructor expects learners to work hard and to be honest about points of confusion and frustration, as well as to complete the readings as scheduled/negotiated by class members.

Considerations:
- Learners take courses because they are genuinely interested in the topic at hand.
- An instructor's role is to work alongside and guide learners.
- By eliminating the issue of grades, the instructor can more readily give genuine feedback or response; learners do not confuse evaluation with a grade.
- Learners know when they're not pulling their weight or actively participating in the course; the responsibility is theirs.

Insights:

- Some students abuse the instructor's intentions. Grades are not the issue.
- Grades do not equal evaluation.
- This is frequently the first opportunity students have had to take responsibility for their own learning. The focus shifts away from grading.

Assessing Student Work

Presentations

As evident in the above examples, presentations and the evaluation of those form the basis for a number of collaborative learning assignments. These presentations are alternately evaluated by other class members, the students themselves, and/or the instructor. The evaluations sometimes take the form of a *holistic score* (based on a scale of 1-4, for example) *based on established or generated criteria.* Other times the comments are more general, yet directed to provide meaningful feedback from which the group can reconsider future presentations

Peer evaluations offer class members the opportunity to more carefully consider their own presentations, as well as those of the groups to which they respond. The use of peer evaluations also provides an opportunity to develop more focused criteria from within the group. Most of the instructors using peer evaluation have not felt the need to develop more formal reporting devices.

The development of an *evaluative rubric* is often a significant learning experience for students. An instructor is able to listen in as students discuss the most significant criteria for evaluation, as well as offer criteria of his or her own. This activity offers students the opportunity to become more personally involved and invested in their own evaluation. Most instructors note that class-developed rubrics are equally or more rigorous than their own.

Self-evaluation, whether from a collaborative group or an individual, is viewed by many educators as the most powerful form of evaluation. It is an ability that, if nurtured and supported in more formal learning situations, can best serve our students when they leave the university. We are not advocating self-evaluation that is out of touch with the response of the larger community. Rather, it is built upon the feedback of an invested community of learners, of which the instructor is only one member. As instructors, we have occasionally found ourselves in the position of valuing a presentation or paper less than the majority of class members. Such situation closely reflect our own professional experiences among colleagues.

Written Products

Collaboratively authored papers are often given a *single grade* which each group member then receives. Some instructors ask individual group members to *attach an addendum* to the group paper in which each is able to spell out contributions, successes, frustrations, and legitimate problems the group or individuals encountered. Taken as a whole, the addenda provide the instructor a larger picture to consider if individual grades are given or if the collaborative assignment is just

one of several requirements during the course of the semester.

Another option, the one spelled out in the introduction to this sourcebook, is to assign a paper or presentation *a total number of points which group members then distribute* according to the efforts each has contributed. This option addresses the occasional issue of group members whose schedules conflict with meeting times, or group members who are legitimately ill.

The most frequent concern voiced by instructors, however, is that some students will "coast" and not contribute equally to the experience. While this is sometimes the case, more often instructors are pleasantly surprised at the quality of presentations or papers that could not have been authored by one student alone. Offering collaborative assignments allows instructors the chance to see students from a new perspective.

Assessing the Effectiveness of Collaborative Groups: Focus on Improving, Rather than Judging, the Collaborative Process

The final concern in this brief chapter is to consider how we might support our students as we increase the opportunities or requests for collaborative work. Students often report a growing weariness when they speak of the number of groups they must meet with outside of established class times. We might begin with considering our own collaborative work with colleagues. All of us have struggled with nagging deadlines and multiple commitments as we jointly author articles or conference presentations. The instructors who have contributed to this sourcebook have all adjusted their guidelines and requirements based on feedback from students. This has led many of us to offer, rather than require, collaborative assignments.

Reflecting on the particular successes or roadblocks of a collaborative assignment is valuable for the class as a whole. When students are given the opportunity to participate in a "second round," they are frequently able to build on the experiences of more successful groups. We miss out on a valuable opportunity when we fail to build in time to learn from our collective involvements.

The current authors of this sourcebook welcome your comments or suggestions at any time.

References:

Burke, C. & Short, K. (1991). Creating Curriculum: Teachers and students as a community of learners. Portsmouth, NH: Heinemann.

Gossard, J. (1989). "Read-Around Groups." An unpublished paper, Indiana University, Bloomington, IN.

Mills, H. (1986). Writing Evaluation: a transactive process. Unpublished doctoral dissertation, Indiana University, Bloomington, IN.

Neilsen, A (1989). Critical Thinking and Reading: empowering learners to think

and act. Bloomington, IN: ERIC.

Written by Kathy Egawa, Language Education. Thank you to the professors and instructors cited above.

Professional Reading Group Evaluation

Name _____ Book _____

Date _____

Write YES or NO in each box to tell how well the members of your group participated in this activity. You may write comments about anyone in the group or about the group as a whole.

Members of the groups					
Came prepared					
Shared thoughtful ideas					
Helped the group function well					
I like working with this person					
Is this person a 1, 2, or 3 (low)?					

Comments: _____

_____

_____

Three Pluses and Wish for your group:

+

+

+

Wish:

Three Pluses and a Wish for yourself:

+

+

+

Wish:

DRAFT

This form has alternately been used as a group evaluation device for both inquiry projects and professional reading discussions. Different instructors have revised it as necessary.

APPENDIX B

Note: I'm sorry I have no reference for this sample. I have included it, nonetheless, as it outlines another example of assessment concerns for group process work.

Tools for Groupwork Evaluation

SAMPLE STUDENT QUESTIONNAIRE

Name: _____

Please mark with an "X" on the line to the left of each answer that is most like how you feel for each question. Remember, this is not a test. There are no right answers. I want to know what you think.

Section A

1. How interesting did you find your work in the group?
   _____ a. Very Interesting.
   _____ b. Fairly Interesting.
   _____ c. Somewhat interesting.
   _____ d. Not very Interesting.
   _____ e. I was not interested at all.
2. How difficult did you find your work in the group?
   _____ a. Extremely difficult
   _____ b. Fairly difficult
   _____ c. Sometimes difficult
   _____ d. Not too difficult—just about right
   _____ e. Very easy
3. Did you understand exactly what the group was supposed to do?
   _____ a. I knew just what to do.
   _____ b. At first I didn't understand.
   _____ c. It was never clear to me.
4. *For Multiple Ability Tasks*
   a. What abilities did you think were important for doing a good job on this task?

   b. Was there one ability on which you thought you did very well?
   _____Yes _____No
5. How many times did you have the chance to talk during the group sessions today?
   _____ a. None
   _____ b. One or two times
   _____ c. Three to four times
   _____ d. Five or more times
6. If you talked less than you wanted to, what were the main reasons?
   _____ a. I felt afraid to give my opinion.
   _____ b. Somebody else interrupted me.
   _____ c. I was not given the chance to give my opinion.
   _____ d. I talked as much as I wanted to.
   _____ e. Nobody paid attention to what I said.
   _____ f. I was not interested in the problem.
   _____ g. I was not feeling well today.
7. Did you get along with everybody in your group?
   _____ a. With few of them
   _____ b. With half of them
   _____ c. With most of them
   _____ d. With all of them
   _____ e. With none of them
8. How many students listened to each other's ideas?
   _____ a. Only a few of them
   _____ b. Half of them
   _____ c. Most of them
   _____ d. All of them, except one
   _____ e. All of them

Section B

1. Who did the most talking in your group today?
2. Who did the least talking in your group today?
3. Who had the best ideas in your group today?
4. Who did most to direct the discussion?
5. Would you like to work with this group again?
   _____Yes _____No
   If not, why not?
6. How well do you think the facilitator did today in his or her job?

Anth E402 Gender in Cross-Cultural Perspective Fall, 1989

PEER EVALUATION OF STUDENT PARTICIPATION IN GROUP DISCUSSION PROJECTS

As indicated on the syllabus, participation in and contribution to the five group discussion projects counts for 20% of the grade for this course. To assist the instructor in accurately and fairly assigning this component of each student's final grade, I solicit peer evaluations. Having worked closely with one another in the group discussions you are in a good position to do this. For each member of the class, excluding yourself, please provide a numerical rating on each of the following.

PREPARATION

(1) Outstandingly well prepared for discussions. Had clearly given a thorough reading of all assigned materials, and carefully considered all questions posed in the assignment guidelines.
(2)Generally well-prepared for discussions. All materials read, and able to respond to issues raised in the guidelines.
(3)Adequately prepared for most of the discussions.
(4)Some defficiencies in preparation. e.g. absent, hadn't read some of the materials, read superficially or hadn't thought about some of the questions.
(5)Marked defficiencies in preparation in comparision to others.

COLLABORATION

(1)An outstanding collaborator. Listened well to what others had to say; exhibited abilities in synthesizing or summarizing data and positions that emerged in group discussion; was a key player in moving group discussions forward in a focused and productive fashion.
(2)Above average contributions as a collaborator by making clear contributions to the group's ability to complete its assignments.
(3)Adequate or average effectiveness as a collaborator.
(4)Role as a collaborator somewhat diminished or less effective than average. e.g.hindered or didn't actively contribute to moving the discussion along in a productive fashion.
(5)Marked defficiencies or problems with person's contributions as a collaborator in group discussions.

Indicate your evaluation on the attached sheet and return it to Barbara Jackson along with your final examination , due on December 13. All materials received will be held in strictest confidence and will be utilized only to assist the instructor in evaluating the group discussion course requirement.

S1

THE ROLE OF MEDIA AND TECHNOLOGY FOR COLLABORATIVE LEARNING

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Introduction

The key to the role of media and technology in collaboration--as it was defined at the beginning of this book--is the enhancement of interactive learning environments. Traditionally, educational media have only been used to enhance instruction via instructor lectures, presentations, and demonstrations. Media have helped to fan audience interest by illustrating the lecturer's points through yet another medium or to facilitate dividing portions of knowledge among students in large lecture halls. Most technological innovations, such as cable television, video conferencing, and computers, were used to supplement, or even supplant, live teaching. "Individualized instruction," in the guise of automated tutorials or drill and practice were, all too often, pale substitutes for traditional instruction. In short, technological innovation has typically supported the antithesis of collaboration. Not only did the new media enforce separation of learners from instructors, they also fostered a learning environment that discouraged group interaction. In fact, previous "innovations" seemed to carry the message that traditional instruction could stand enhancement.

The resistance to using new technologies in instruction arises from this misapplication. For example, television did not, as was promised in the 1960's, replace the instructor in the classroom. It seems safe to predict that the computer will not replace her, either. However, before discarding the technological baby with the pedagogical bath water, we need to be reminded that the apparent failure of technologies in instruction is not the fault of the tools, but of the users of those tools. A shift needs to be made in the teaching paradigm, and collaboration is a means to make that adjustment. It will probably succeed (or fail) on its own accord, without technology. It is our contention, however, that the extant, readily available media will engender collaboration and enhance concomitant group interactions in new ways. In the discussion and case studies that follow, we offer partial proof of the efficacy of educational technology for supporting a more appropriate learning paradigm.

Different Functions for Media in the Facilitation of Collaborative Learning

Media can serve at least four major functions in a collaborative learning environment: (a) they provide the physical content that the learner has to transform into conceptual content; (b) they carry information between those involved in the learning process; (c) they provide different formats that enable people to work together, or (d) to evaluate their work.

A. Providing Appropriate/Authentic Data and Information Sources

Media's first function is also their most traditional one: to capture the

knowledge content to be learned in a way that makes teaching largely independent of time and place. Knowledge is stored in books, pictures, videotapes, etc. that can be conveniently stored on shelves. Traditional teaching uses media as canned knowledge for individual consumption. Collaborative learning approaches to teaching use media as a challenge for students to become increasingly independent of the instructor's pre-packaging of knowledge. If learning is the ability to make sense, to reduce complexity and discover order, then students need to be given opportunities to practice this for themselves. Providing appropriate data and information bases and expecting students to explore these on their own, is a prerequisite for their cognitive development. The instructor no longer tells what she knows; she creates a facilitative learning environment. Choosing the right media (i.e., those that stimulate and challenge without frustrating the students) is a key task in this approach. It is a logical next step to have students create their own information bases when the opportunity arises to do so. Having them produce the media for their own learning (whether these be text, images, objects, or electronic recordings) is likely to increase motivation and the sense of responsibility for their own intellectual growth.

B. Democratizing and Diversifying Communication

The second function that media have is to connect people with each other. In the context of traditional instruction this usually means one-on-one exchanges between instructor and individual students or one-to-many communication from instructor to the whole class. Using the communicative power of media for collaborative learning shifts the focus from the hierarchical and teacher-centered model to more egalitarian forms of communication. Learners communicate with each other (as well as the teacher). At the present time, most of these exchanges take place in a written form, either on paper or electronically. Writing for an instructor is often times associated with writing for a grade. It thus has an agenda connected with it that may stifle spontaneity or even truthfulness. Writing for peers creates different dynamics. The range of purposes for writing is larger: one may write about personal things to another classmate; one may write to take care of some housekeeping tasks with the members of a work group; one may write a discussion paper to be read by the whole class; one may request information from other students, teachers, institutions; or one may write to establish relationships with people of similar interests in other places of the university, the country, the world, etc. These types of communication seem more authentic or genuine and are more likely to prepare students for the requirements of the "real world."

C. Structuring Group Processes

If a class is no longer "taught" by an instructor, but students are helped by a facilitator to organize their collective learning processes, then the typical classroom activities are changing. They are no longer controlled (at least not totally) by one person; they are influenced by various groups of persons. In order for groups to take control over their interactions, group activities need to follow certain formats (such as: brainstorming, voting, jigsaw tasking, reflecting, conflict solving, etc.). Each of these formats may be facilitated by a medium, for example: brainstorming can be done by each student writing his or her ideas on index cards which are then put into a large pile; it can also be done by one student functioning as the recorder and writing each idea onto a large sheet of paper or an overhead transparency; or it can be done using a sophisticated computer network that allows each student to type in ideas anonymously on terminals and compiles them into a large list on a video

projection screen in the classroom. Obviously each of these media are more or less appropriate in different contexts for different types of classes.

D. Integrating Evaluation Into the Learning Process

In collaborative learning, evaluation may become part of the group process. Individuals not only need to know how they are mastering important concepts, they also need feedback on how relevant their contributions are to the rest of their group, and they need to assess how much progress the group as a whole has made toward the completion of a project at various points in time. Different media contribute different nuances to the evaluation process. It is obvious that verbal feedback has characteristics that are different from written feedback, and that open feedback may result in different comments than anonymous feedback. Students can write a self-assessment on paper; they can keep portfolios of their work in whatever medium this work was done; they can take mastery tests on a computer; they can rank each others' contributions in pie-charts; they can write comments to each others' drafts of papers; or they can insert personal assessments of each others' work into anonymous computer files. Most evaluation involves the written media. The arrival of computer networks is adding many new opportunities for making written feedback an integral part of ongoing group projects. Thus assessment can stop being mostly a grading mechanism for finished products, and focus on facilitating and documenting the learning process it takes to arrive there.

How Current Media/Technology can Fulfill These Functions

No medium is inherently "better" than another one just because of its novelty or technical sophistication. Computers and interactive video set-ups can do astonishing things; but some other "low-tech" media may be much more appropriate for certain instructional contexts. In fact, it is generally recommended to start with the exploration of simple, old-fashioned media such as overheads, slides, and audio or videotapes, before plunging into complicated technological set-ups that are prone to burying the pedagogical objectives under a host of logistical and technical problems. The following section describes select collaborative activities that can be facilitated by a variety of different media. We will start with the most readily available ones and gradually move to the most complex educational technology available today.

The Use of Traditional Media for Collaboration

The most common media in today's classrooms are often times also the easiest. Since simplicity and ease of use is an important rule of thumb for any instructional activity, the traditional media will continue to play an important role for learning and instruction. Here are some options for how to use overheads, photos, slides, graphics, and the various formats of audio media for student-centered learning activities.

<u>Overheads</u>

Overheads are mostly a presentation tool. It is therefore difficult to think of many applications for collaborative learning. They may:

* Provide a stimulus for small-group discussion. Any type of visual representation of an object, a concept, an idea, a feeling, etc. can be used to engage

students in discussions that are theirs to control, at least temporarily. Of course, other media can do the same, e.g., a picture, a slide, a graph. Overheads have the advantage of easy projection, and one can add to them through writing and drawing.

* Collect and organize lists of ideas from brainstorming sessions. Small groups of students may brainstorm a topic before talking about it in thewhole class. Each group writes the results of their brainstorming on a transparency so that later on the ideas of all groups can be compared and discussed easily.

Photos/Slides/Graphics

Especially for these easily available media, collaborative activities break into four categories: (1) producing, (2) collecting, (3) regrouping, (4) stimulating. Here are some tasks they can accomplish:

* Show pairs (or sequences) of slides or photos and ask students to discuss (in groups of two or more) questions like:
  - What do the images have in common?
  - How do the images differ from each other?
  - Which story are they telling (in case of an image sequence)?

* Give sets of images/slides to small-groups. Have each group sequence them and develop a rationale for this sequence. Then let the groupcompare the different sequencing rationales in class and debate their pros and cons.

* Have groups of students collect pictures and graphics from newspapers, journals, etc. for portfolio projects. The visual material can be either subtitled and sequenced or used as a basis for further written or oral analysis.

* Send small groups of students out on a field trip to take photographs or slides of anything they see as important about a certain topic. The results of this visual journey can then be presented to the class or handed in for a group project.

* Give student groups the task to illustrate important concepts, ideas, theories, segments of their textbook, etc. by either collecting or producing images that could enhance instruction of these concepts or ideas.

Audio media

Including music, sound effects, books on tape, newscasts of historical events, and recordings of interviews or live events. These can be utilized for different collaborative activities:

* Like overhead transparencies, slides, or photos, various types of audio recordings may serve as stimuli for group brainstorming and discussion.

* Have individual students go out and collect three pieces of sound recordings each (according to some broad parameters provided by the overall purpose of the exercise). Then randomly assign students to groups and let them

negotiate a logical story line for the total set of recordings in their group.

* Have students produce the narration to a slides show and record this narration onto an audio track running in sync with the slides.

* Using a reel-to-reel recorder and some inexpensive cutting devices, have students edit longer audio recordings in order to create:
  - a tape of highlights;
  - a tape of interesting juxtapositions between various elements of the original;
  - a whole radio program.

The Use of Films and Videotapes for Collaboration

Films and videotapes also count among the "traditional" media. In the following we will not talk about 16mm films as a separate medium because they are increasingly replaced by videotaped versions, and videotapes subsume virtually all of the potential that 16mm films offer for student collaboration. The use of films and videotapes can be divided into three categories:

Watching films/videotapes

This is the most common use, running the highest risk for reducing students to a passive consumer role. Some activities that put the learner back "in the picture:"

* Before viewing, focus students' attention by having them briefly discuss in small groups one of the following questions:
  - what types of expectations the title of this film (or the year it was produced, or its filming location/s, etc.) raises in them;
  - what other films they have seen (or experiences they have had, stories they have read or heard) that relate to the topic of this film;
  - what they know about the key concepts discussed in the film, or what they believe regarding the underlying thesis of the film.

* During viewing, increase students' active cognitive processing by:
  - having different students (from each group) pay particular attention to one specific aspect;
  - having different students (from each group) watch the film from different point of view (e.g., the viewpoints of different protagonists in the film);
  - stopping the film at certain points and letting students write comments to a question, or make predictions as to what they think happens next;
  - showing certain parts of the film without sound or without picture and letting students "fill in the blanks;"
  - stopping the film and repeating a certain segment, or contrasting it with a segment from another film.

* After viewing, help students to gain new insights from the viewing experience by:
  - having each individual in a collaborative group share at least one new idea learned;
  - having student groups reach consensus on the main ideas;
  - having groups construct a summary outline of the film (see Adams,

Carlson, & Hamm, 1990);
- having students discuss the film according to the different viewpoints to which each group member was assigned;
- having students compare their "fill-in-the-blanks" or written comments to the teacher's questions during the film.

Of course, it is also possible with more advanced students or with additional assistance from the instructor to have a group of students select a film and prepare the classroom activities that go along with its viewing.

Shooting videotapes

Learning to become a critical consumer or analyst of visual events may be best supported by turning consumers into producers. Video technology nowadays is cheap and easy enough to handle for many students to go out and produce their own videotapes. The need for postproduction (i.e., editing the raw video footage) should be avoided. A variety of production categories come to mind that fit this requirement. Some of them are:

* The documenting of a field trip. This is similar to what can be done with a still camera, filming any relevant objects, behaviors or activities that contribute to a topic assigned for exploration in the real world.

* The documenting of an event, something that is visually accessible and of limited duration so that it can be played back in class.

* The recording of live interviews, in which a crew of students plays TV-reporter and solicits responses from people on the street or in public places to one or more survey questions.

* The collection of video clips from television, thus illustrating a selected issue, opinion, or event. A professor of anthropology at IUB (Martha Kendall) has used most of these activities in her introductory course.

Using video feedback

Video is not only a medium for looking outward, it also serves very well as a medium to reflect upon one's own behavior. As such it has been common in many professional fields since the early 1970ies, serving as feedback instrument for the training of physicians, counselors, teachers, athletes, public speakers, etc. In this function video typically serves to:

* Record role-plays and simulations that are then reviewed and critiqued by trainers, trainees, and groups of peers;

* Record actual activities/performances (such as classroom lessons, counseling sessions, staff meetings, surgery) for later individual and collaborative reflection in class.

In addition to these common usages of video for complex professional skill development, there are other applications of the medium that are not restricted to professional skills training:

* Record think-aloud problem solving activities. Although originally a research tool for discovering different problem solving patterns in novices and experts, the videotaping of an individual or a small group of students talking their way through an academic task can be a good stimulus for further reflection. The replay can help students (preferably in groups) to recognize different problem-solving strategies and learning styles and increase their own repertoire.

* Record the instructor's, student's, or peer-group's feedback to a role-play, an actual activity, or a think-aloud exercise. Again, collaborative groups can then take this videotaped feedback as a stimulus for further reflection upon the original task.

The Use of Videodiscs and Interactive Video for Collaboration

Videodiscs and Interactive Video usually go together, adding a computer interface to the former to create the latter. Instructional designers have distinguished between different levels of "interactivity" within interactive video formats; the lowest being a plain videodisc containing an uninterrupted string of audio and visual elements (individual pictures or a whole film). Videodiscs are played on a videodisc player (videodisc recorders do not yet exist; discs are pressed in special labs) that are equipped with a remote control. Remotes essentially are little computers that often allow rudimentary programming by the user, for instance, entering a specific sequence of stills or video/audio clips that will make the videodisc player access these stills and clips in rapid succession. Videodiscs have several important advantages:

* Rapid random access, jumping from one end of the disk to the other in less than one second;

* Perfect freeze frame, effectively turning the videodisc into a handy slides projector;

* Index numbers for each individual frame that allow each image to be called up at will;

* A total of 54,000 images that can be fit on one side of a videodisc (the most advanced disk players allow double that number);

* Two audio tracks that can be accessed individually or in stereo.

Videodiscs may consist of a large data base of individual images (large slides collections), or of a half-hour (nowadays up to one-hour) film, or of a combination of both, similar to the current CD-ROM versions of large encyclopedias, containing a mixture of text, images, sound and video clips. Collaborative activities with videodiscs are therefore similar to what can be done with photos, slides, computer graphics, audio- and videotape. Some of the group projects described under those headings can become more involved and more elegant with videodiscs (a) because of the sheer number of available visuals from which to choose and (b) because of the ability to re-sequence these visuals very quickly without having to physically move them around.

Interactive video (I.V.) adds more options to manipulate the videodisc. Instead of using a simple remote control, a personal computer is connected to the videodisc player, allowing an integration of audio, video, and the various aspects of computing. Truly integrated systems do this on one monitor that allows computer graphics or text to be laid on top of the video image. Learners are in control of multiple communication channels all in one medium. Their active involvement with the program influences the way the action on the screen evolves.

Traditional instructional design has favored individual use of the medium, having each student interact with their own I.V. station. This may be appropriate when simple concepts and procedures are to be learned from an I.V. program. The learner can take full advantage of the medium's "patience" that allows the individual to proceed at his or her own pace, pausing and repeating at will without fear of instructor criticism. The following examples focus on complex problem solving and skill development tasks that lend themselves to more collaborative arrangements.

Case/Interaction Analysis

The training in complex interpersonal skills is a time-consuming task in many professions that academic programs are ill-prepared to adequately provide for their students. Doing first-hand observations, critically analyzing cases, and receiving expert feedback on behavior models requires many hours that instructors cannot always afford. Future teachers, counselors, physicians, lawyers, managers, etc. can only hope that proficiency in their professional interpersonal skills will eventually be reached through trial and error on the job.

Interactive video programs can make this transition a little easier and considerably more reflective. They can provide rich and authentic case materials for analysis and discussion, allowing students to take a close look at pertinent behaviors in context. The difference to linear videotapes or films consists of more than the mixture of media that are combined in interactive video. Other advantages include the frequent switch from passive viewing to active intervention in the action on the screen; possible instantaneous branching to different segments of the action; and branching to different layers of information, for instance, from the actual behavior or action on the screen to pertinent background information about the action, to expert comments, to the actors' self-reflections, to prior users' interpretations, or to one's own personal folder containing written comments, edited text, and video clips from the program's information base. Three examples of such IV programs are "Marital Fracture" at MIT, a case study for the social sciences (Gerstein and Sasnett, 1987); "Obex" at IU-Bloomington, an observation exercise for the training of school psychologists in interviewing skills (Hansen, 1989); and "Analysis of Classroom Subsystems" (1992), a program on classroom management for pre-service teachers (also developed at IUB's Institute for Child Study).

Such programs can be viewed and worked on individually, but in light of the overall intent to make students more reflective observers, critics, and performers of a target skill, it makes more sense to structure the task such that pairs or small groups of students collaborate on their analyses. These collaborative structures can be similar to the ones suggested earlier for the viewing of film and video.

Self Analysis

Self-analysis programs are adaptations of the video-feedback format to the interactive video medium. They have been used in business and sales training (Ives, 1989), and we have also experimented with them at IU-Bloomington (Hansen, 1990). In the latter case, a videotape recorder was linked to a computer, and students used tapes of themselves performing the target skill (school-psychological interviewing) to critique their own actions. The program focused attention on their questioning behavior. Students were asked to electronically mark and then transcribe a sample of ten questions from their tape. After the transcribing of each question, students were guided through a multiple-choice taxonomy requiring them to judge their performance on a sequence of dimensions. Having answered all the items in the taxonomy, students were given a short summary of their self-analysis, highlighting the dimensions they had judged unsatisfactory. According to this summary, they were then asked to type an improved version of their original questions into the computer. Similar procedures can be created for other component skills, and it is not difficult to imagine how such programs might be created for other target skills.

The collaborative aspect of such programs comes into play when adding peer reviewers to the original task. A second student--or maybe two students simultaneously--can review the tape and analyze the transcribed items, typing in their own suggestions for improvement. The peer reviewer/s then meet with the first student to discuss each version of question-rewrites. The instructor may come in at this phase of the exercise to facilitate or add to the feedback.

Simulation

A third model for interactive video is the simulation. To many, IV-simulations are know through the flight simulators that are widely used in the military and civilian pilot training. Flight simulators are interactive video programs with a special interface (aircraft steering instruments) instead of the standard computer keyboard. Similar programs have been built to simulate welding and other procedures. Such programs are very effective in areas where the manipulated variables are limited and where the rules of their interaction are predictable, such as in physics, chemistry, or the medical sciences. One of the most attractive programs in recent years has been the simulation of an emergency room, where the student is put in control of an emergency situation under heavy time pressure. She or he has to make a sequence of diagnoses and prescriptions that lead to either improvement or deterioration of the patient's condition, either of which is dramatized on the video screen (see Bayard-White, 1989:32).

Simulations have also been used to sensitize students in ethical and aesthetic decision-making. Project THEORIA at Carnegie Mellon University has been creating compelling, interactive simulation environments for testing students' values and theories regarding arts and morals (Covey, 1989). They have developed programs that explore the user's reactions to controversial issues such as the right to die, art forgery, and abortion. "A Right to Die?" deals with an authentic case, using documentary footage collected over several years as part of the visual data base. Users going through the program are confronted with a series of ethical choices that have to be made as the case unfolds. The feedback they receive (in a variety of different modes) challenges their decision by providing evidence and arguments supporting a different choice. The program does not argue any one

moral or ethical position but rather confronts users with a complex case that hardly ever suggests a single "correct" decision. The consequences of each choice are shown, and arguments for deciding differently are presented for the user's further reflection. Again, it seems appropriate to have students work in small groups on such a program because this provides rich opportunities for articulation and discussion of competing values and beliefs. Having to explain and to justify one's own values to a group of peers in the context of a concrete and very dramatic situation may be one of the most powerful ways for developing maturity of judgment.

The Use of CAI and Hypermedia for Collaboration

The aforementioned examples have already illustrated the main mechanisms that make interaction between machine and learner possible and that make collaboration among groups of learners-- interacting with the computer--productive. Computers allow the sequence of a learning activity to be broken down into many different elements that can be arranged in many different ways and accessed so seamlessly that it will look to the learner like one natural string of events. Computers also allow the sequence of these elements to be determined by the behavior, i.e., the input of the learner, based on a pedagogical rationale predefined by the creator of the program.

There are two important considerations for the design of an educational computer program: (a) whether it should be a tutor or a tool, and (b) whether it should follow a convergent or a divergent design. The computer as tutor teaches the learner a certain content domain (facts, concepts, principles, procedures), i.e., the program has all the content it wants to impart on the learner. The computer as a tool is an empty shell that provides certain functions for building and manipulating a product. Word processors, spreadsheets, data bases, graphics and statistical packages are commonly known examples for this. Specially designed educational programs may combine and customize several of these tools to help the learner accomplish certain tasks.

Computer tutorials almost always follow convergent designs, i.e., they channel the learner's progress through a limited number of paths toward a common goal (the mastery of a set of facts, concepts, or procedures). Divergent designs allow the learner to explore according to their own needs and interests. There is no single predetermined goal. Students are encouraged to arrive at different conclusions that reflect their own interpretation of the information encountered and processed along the way.

Computer-assisted instruction (CAI) often combines the tutorial approach with a convergent design. Most CAI-programs are designed to train individual learners in a certain content area. They typically start with a pretest to define the learner's prior knowledge so that unnecessary duplication and redundancy can be avoided. They then present the information step by step, making sure the learner mastered each one before moving on to the next, and finally administer a comprehensive post-test with feedback as to how well the material has been learned. The strength of such programs lies in the careful sequencing of the knowledge components, the "patience" with which the system provides feedback to the learner thus avoiding the embarrassment factor of face-to-face instruction, and the high degree of adaptation to the individual's pace and learning patterns that a good program can provide. It

should be obvious from this description that collaborative learning is generally not part of the conceptualization of such programs although they may be used to prepare individuals with the knowledge needed for collaborative phases in the learning process (or further discussions of the pedagogical implications of CAI, see Streibel, 1991; and DeVillar & Faltis, 1991).

Computer-assisted instruction can also take on the form of a simulation or a game. In that case, the medium lends itself more to collaborative approaches. One example is the Collective Bargaining simulation program at IU-Bloomington's division of Labor Studies (David Spencer/Jeffrey Vincent). The simulation allows students to participate in the process of contract negotiations by assigning them roles on either the labor or management negotiating teams. The computer program is used to store, retrieve and manipulate data to provide each side with a powerful bargaining tool. Many other examples can be found in the literature (Adams, Carlson & Hamm, 1990; Gayeski & Williams, 1985).

Hypertext and Hypermedia have become the "new and improved" versions of computer-assisted instruction. They received a major boost with the introduction of the HyperCard software for the Macintosh in 1987 and recently with Microsoft Windows (1990) for the higher-end PC's. Hypermedia--hypertext being a subcategory--allow the many elements in a data base (consisting of text, graphics, pictures, video, and audio media) to be linked in more than just a hierarchical tree structure. Each unit (often consisting of one screen-full of information) in a subsystem can be linked to any other unit inside or outside that subsystem. Moreover, it can be linked to specific elements (e.g., individual words) of other units (e.g., text documents) in any subsystem (e.g., a portfolio of text documents and graphics pertaining to one theme). The hypermedia program allows instant movement from any one element to any other element with whom a link has been established. It thus provides for rapid and highly idiosyncratic maneuvering through the available information, much like associative thought processes, quickly zooming into a detail or zooming out to see "the whole picture" or moving over to a different aspect of the content.

These mechanics of the system become pedagogically relevant when filled with the following features:

1. Authentic documents: Due to the improved graphics capabilities of current microcomputer technology, the pieces of information in the data base can look like the original documents (whether text or picture) rather than a computer screen with 25 lines of text.

2. Virtual spaces: The program can simulate the informational aspects of different types of environments that the learner needs to enter in order to complete a project (e.g., a library, a client's office, city hall, a bulletin board in the cafeteria, etc.).

3. Complex tasks: Students can work on complex projects using relevant information obtained in those different environments.

4. Individual and group folders: Students can store their work in separate folders that become part of the program. Entries in the folders remain

linked to the documents upon which they comment. The folders belong to individuals or groups with variable access rights that may be extended to the rest of the class.

5. Tracking of user paths: The program keeps track of how a user moves through the different environments. This helps the user retrace his or her steps, if necessary, and enables others (like the instructor) to evaluate the appropriateness of the user's moves.

6. Instructor and peer review: The combination of the tracking device and the individual's or group's folders provide an excellent documentation of not only the final product, but the whole process of a project completion, thus allowing a better evaluation of the learning process by outside observers.

7. Collaborative building process: Hypermedia systems can be designed such that learners contribute to the building of the data base. That way, generations of students could gather information that is pertinent to a whole knowledge domain. Students may be involved in the information gathering only; they may become involved in the structuring of the information (i.e., the linking of the different elements); or they may be involved in the conceptualization of the program as a whole.

Hypermedia offer some of the most versatile mechanisms for involving students in the collaborative exploration of virtually any knowledge and skill domain imaginable. A rapidly increasing number of examples is available in the literature (Conklin, 1987; Markley, 1988; Jonassen, 1989), as well as on the campuses of Indiana University (for an example, see Davis, 1991; for further information, contact Instructional Consulting at IUB -- Ph: 855-9023). Most promising to us seems to be the notion of involving courses across different semesters in the building of large hypermedia programs consisting of case materials derived from students' own experiences. The professional schools (law, education, business, medicine, etc.), in particular, could profit greatly from the case knowledge their students acquire during practica and internships. Systematically introducing these experiences to the classroom would offer far-reaching opportunities for authentic and collaborative learning and teaching.

The Use of Computer Conferencing for Collaboration

The newest development in educational technology involves the computer as a mass-communication device. It has been described under a variety of different terms, including "Computer-Mediated Communication (CMC)," "Computer Conferencing," "Electronic Conferencing," and "Online Education." Its classroom application is usually referred to as an "Electronic Conference," an "Electronic Bulletin Board," or an "Electronic Classroom." On the Bloomington campus it is known as the latter or sometimes under the name of its software, which is "VAX-Notes." Like electronic mail, electronic classrooms are installed on the University's central computing network. This makes them available for anyone with an IUB Vax-account from anywhere on or off campus. This ubiquitous access is one of the key advantages of the new technology. It allows people to communicate with each other independent of time and place. Unlike electronic mail, electronic classrooms are usually created for the members of an individual course. The open bulletin board format allows messages to be posted for every class member to read and

respond to. It has most often been used to facilitate administrative tasks, allowing the instructor to post announcements, lecture notes, or test results in between class sessions.

Beyond this mere convenience function, electronic conferencing can also serve valuable pedagogical purposes. In fact, it may be one of the most promising media available for facilitating collaboration. Systematically integrated into a course, it can dramatically increase communication in a class and improve its social climate. Class discussions no longer need adhere to the rigid structure of class time and common meeting places. The electronic classroom provides a democratized forum for all group or class members to express themselves in a reflective way that is largely free of the pressures of face-to-face discussions. Using this medium, commuter students finally have the chance to become more enfranchised members of the university community. "Traditional students" could profit equally from the increased opportunity to communicate with and learn from "non-traditionals," who up until now had little opportunity to share their experiences with their younger classmates. In the long run, the concept of "regionalized campuses" may become archaic. Collaboration can extend beyond the boundaries of the classroom or the campus. It can also begin the integration of different disciplines, first on one campus and eventually across different campuses or even different countries (see Harasim, 1990; Mason & Kaye, 1989; Waggoner, 1992).

Detailed examples for how to use computer conferencing for collaboration in a regular classroom setting are given in this source book. We will therefore restrict our comments to some generic models for setting up such conferences. These models can be used in many disciplines and have shown their usefulness in the past (see Hansen, a.o., 1991).

Model A: Discussion Topics

This model involves the electronic medium as an extension of the classroom. The opportunities for students in regular class meetings to participate in a discussion are limited. The electronic classroom creates additional opportunities. This may include topics that could not or could only partially be addressed during regular class time, or more generic topics that are kept open throughout the semester (such as a topic for general suggestions about the course, for questions before and after an exam, for comments to the final class project, or just for general socialization purposes). (see the current electronic classrooms of Don Cunningham: EDUC P550; George Heise: PSY P199; Debora Shaw: SLIS L501; or Janet Streepey: HON H200, on the IUB-VAX-system)

Model B: Case Studies

This approach involves case scenarios that function as stimuli for debate. Students are divided into groups. Each group member is given a different role from which to analyze a given case. The groups then proceed to debate the pros and cons of a case in the electronic medium. When the class meets again face-to-face, these electronic discussions provide the basis for a final whole-class debate that compares the viewpoints from the different groups.

Model C: Data Bases

This model makes use of the considerable potential of whole classes for compiling large amounts of course-relevant information into one data base that can

easily be accessed by each class member. Examples include: a compilation of literature references, literature reviews, case materials, and students' comprehension problems with the readings. Data bases in this medium do not have the elegance of a hypertext program (s.a.), but they have the advantage of relative simplicity of structure and easy access from anywhere on or off campus. (see the electronic classroom of Debora Shaw: SLIS L501)

Model D: Project Reports

Larger projects can also be done with the help of computer conferencing. Group members may use e-mail to communicate with each other if they cannot meet in person. The documentation of their weekly activities can be published in the electronic classroom to reinforce accountability and allow all class members to profit from each others' experiences (Chong, 1992). The final project reports may also be made accessible in the electronic bulletin board for everyone to read before each group makes its presentation in class. (for a small version of this model, see the electronic classroom of Dan Sharpless: HPER R337, and his article in this sourcebook)

Model E: Test Preparation

Students and instructors alike complain about the shortcomings of multiple choice tests. In most cases, they lead to the rote-memorization of simple facts that may not be representative of the actual pedagogical goals of the course. Students commit these facts to short-term memory with little or no result for the improvement of their critical thinking and problem-solving potential. Adapting an approach developed by Martha Kendall (Anthropology, IUB) to the electronic medium, students are given their test questions to preview and debate in groups in the electronic classroom. These questions involve considerable exploration of the assigned readings, asking students to compare and contrast concepts and theories across different chapters, apply them to concrete problems and debate their implications for related issues. Groups of students have their own electronically protected work space in the bulletin board that allows collaboration between group members while challenging the groups to compete with each other for the most appropriate answers. Preparation for the test is thus extended over several days and becomes one of the most productive learning experiences in the course (see Robert Althauser's article in this sourcebook).

Model F: Reflective Journal

As educational psychologists have begun to recognize the importance of reflection on one's own learning processes ("metacognition"), instructors have started to incorporate the use of "reflective journals" into their courses. Students are asked to take a quiet hour every week to cogitate upon the personal relevance of what they have been learning in the course and to express these thoughts in writing, using a private journal format. Students reveal all or select portions of these notes to their instructor and/or their classmates, or maybe only to one or two "confidant/s" in their class. The careful exchange of such reflections can be of great value for students' personal growth. Electronic conferences can facilitate such activities. Personal notes can be electronically protected or revealed to a select audience. Anonymity, if desired, can be protected using this technology. (Sharon Pugh/IUB has used such approaches)

These are some models for how computer-mediated communication can support

collaboration in a classroom. They all increase interactions between the learners and extend them beyond the physical restrictions of a classroom. They also share the fact that students are stimulated to frequently express themselves in writing, an activity that is often cut short in many college classes although we know it to be one of the most important tools to increase understanding and academic competence.

Barriers Threatening the Use of Technology for Collaboration

Even the traditional use of educational media technology, although typically much less ambitious, has run into frequent problems at our institutions of higher education. Access to media is often a hassle; equipment is poorly maintained and too complicated to handle; formats are incompatible and classrooms ill-suited for effective use of instructional technology. Just finding out which films or videos might be usable for a specific course may take many days of research and previewing in a film library (if one happens to be available on campus). Finding out which computer or multimedia programs are available, is virtually impossible at the present time. "Project SYNERGY" (a national data base for computer programs for remediation with adult learners in math, reading, writing, and English as a second language) is a first attempt toward changing this situation (Anandam, 1992).

We recommended at the beginning of this article to first try and make collaboration work with the use of the simpler and readily available media. Collaborative concepts are largely the same across different media and take some time to explore. Testing these new approaches while at the same time struggling with a complicated and unfamiliar technology is almost bound to lead to frustration and failure. Here are some typical pitfalls for instructors who try to support collaboration through media in their classrooms:

* Collaborative use of the media is not integrated systematically into the course plan. The collaborative activities are used only as an occasional classroom technique. As a consequence, neither instructor nor students develop enough of a routine to make them work smoothly.

* Student resistance to new learning approaches is sometimes underestimated. Once the instructor is convinced that a new medium (such as the electronic classroom) will be beneficial for the learners, he or she tends to forget that it takes more than the acquisition of some technical skills to use the medium efficiently. It also requires a change in attitude and learning behavior that can only be accomplished in small and careful steps.

* Student assessment is not adapted to the conditions of collaborative learning. Collaborative activities are process-oriented and often very time-consuming, especially if they involve the application of unfamiliar technology. If no fair procedures are found to reflect in the course grade the time and effort students spend on a group project, they will resent such activities and not put in the time necessary to make them work.

* The logistics required for the successful use of educational technology are sometimes overwhelming. Especially the large college classes make

meaningful interactions difficult. Besides overcrowded classrooms, two of the worst logistical impediments to collaborative learning (with or without media) are (a) the lack of appropriate group space for small-group meetings outside of class, and (b) the difficulty for students to arrange mutually acceptable times for such meetings.

Conclusion

Collaborative learning can certainly succeed without the help of modern media technology. In many instances it may even be advisable, as shown above, to avoid the use of technology (for a while) in order to fully concentrate on the pedagogical concepts needed for making collaboration work. However, we live in a technological era, and it would be highly artificial to exclude technology from the learning processes that go on in today's classrooms. If we don't explore the collaborative potential of the communications technologies around us, they will counteract our pedagogical efforts outside of the classroom where they are already dominating our lives. Some contain fabulous opportunities for forms of collaboration that would not be possible without them (see computer conferencing). All of them represent a most valuable challenge for instructors and students alike: to use our imagination for finding out what teaching and learning is all about and how it can best be accomplished.

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EXEMPLARS OF COLLABORATIVE LEARNING IN BIOLOGY

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Biology
120 - 340 students
Class set-up: Various

Background

The traditional approach to teaching large enrollment science classes is to: (1) secure a large lecture hall; (2) have a professor tell the class what she knows about the subject; (3) test the students on their memory of what the professor said. From this perspective, students are viewed as passive "receptacles" of knowledge. This is sometimes referred to as the "information transfer" theory of learning.

In contrast, the theory supporting collaborative learning groups in the Bloomington Biology Department emphasizes that learning is an active process. It is not a process of knowledge recording or absorption. Instead, learning is best viewed as a process of knowledge construction (Resnick, 1989); students use current knowledge as a foundation to interpret new information provided by instruction; students then mentally extend and construct new knowledge.

Cooperative learning groups provide an ideal structure for students to "unwrap" new information, construct understanding, and develop critical thinking skills. An environment of peers encourages questioning, evaluating, and criticizing. A change in understanding is more likely when the students are required to explain, elaborate, and defend their position to others (Brown & Palincsar, 1989).

Another contrast to the traditional approach is that students are not considered as miniature versions of professors. Students are both qualitatively and quantitatively different from professors. Perry (1970) emphasizes the vertical development of the intellectual ability of students. Perry proposes that students move from a simplistic, categorical view of the world (right/wrong; we/they;), to a realization that most knowledge is inherently uncertain; however, appropriate criteria can be selected to make decisions; but value judgements are often involved in intellectual endeavors, and eventually one's individual commitment to one or another intellectual pathway needs to be reaffirmed.

Exemplars

The **Evolution and Ecology (L479)** class taught by Craig Nelson has used collaborative strategies for several years. L479 focuses on questions which have no single right answer - topics on which a simple transfer of information from instructor to student is inadequate. The goal of the discussions is to develop real understanding of the judgmental factors involved (and practice in separating issues and making judgements) rather than simply a notebook filled with facts and

predigested conclusions. Discussions are facilitated by a heavy emphasis on student preparation, which in turn becomes a basis for evaluation. The formats designed to deal with these topics use student discussion in three settings.

1) Lecture. Study questions requiring the use of higher order critical thinking skills are provided to the students for each lecture. The students are given a short quiz over these questions. Students are then asked to interact with each other for a few minutes by comparing and contrasting their answers to the questions.

2) Hour long small group discussions. To make the L479 learning groups effective, the communication patterns are expected to differ markedly from what is often called "discussion." Typically the participation of the teacher is minimal, and the students help each other learn.

Participants are expected to follow a rather carefully constructed set of ground rules. The emphasis on preparation is accomplished with students completing (prior to class) a structured "Discussion Work Sheet" for each reading assignment. The following items are included in the work sheet and are the basis for group discussion.

PHASE I - WHAT THE AUTHOR REALLY SAID

a) Define all important terms and concepts.
b) Identify the major themes/points of the article.
c) Summarize the author's general point of view.

PHASE II - WHAT WE THINK ABOUT THAT

a) Integrate the material with other knowledge.
b) Consider possible applications and implications of the material under discussion.
c) Evaluate the author's presentation. Students are expected to base theirevaluation not only on an "objective" analysis, but also to integrate the point of view of their own values.

PHASE III - ROLES In addition to the stated discussion task, emphasis is placed the process of group discussion. In particular, emphasis is placed on the roles individuals must fill to make the discussion successful.

Typically, 120 students are enrolled in this class. For learning group discussion the class is divided into sections of 20 to 30 students each. Students are assigned to a small group composed of three or four students. Group assignments change each week. The discussions are monitored and grades are given by two graduate Assistant Instructors.

3) The third setting for collaborative learning is "out of class study groups." These groups are facilitated by students being rotated through new groups each week. The result is that students are introduced to 20 to 30 students which can then serve as a source for forming groups outside of class. The study materials are a pool of questions, from which the hour exams will be taken. Since grading in the class is non-competitive (no curve) students can feel free to share and and add to their knowledge base with other students.

Molecular Biology (L211) is designed to teach a very difficult subject to sophomores in a manner which enhances both the quality (critical thinking skills) and quantity of their knowledge. Historically, molecular biology has been taught in upper level classes. However, with the technology of molecular biology now being employed in virtually all specialties of biology, the Department of Biology at Indiana University-Bloomington is teaching molecular biology as the first course (beyond "freshman biology") to all biology majors.

Intellectual development is supported in this molecular biology class in three specific ways. (1) Lecture content, worksheets, and reading handouts are designed to challenge and support students in their move to higher levels of intellectual development. (2) Undergraduate Teaching Interns (UTIs) serve as near-peer models as they lead the cooperative learning groups. (3) Learning groups encourage students to practice new intellectual skills in a "safe" environment. (4) The students (and teachers) are given the Myers-Briggs Type Indicator (MBTI) to give students information about their personal learning style. The MBTI results are provided to the students so that they have some categories to "think about their own thinking", so they have categories to understand the thinking of other students, and so that they have a better understanding of the teaching style of the professor.

In a technical sense the lecture format for this class is conventional - three 50 minute lectures per week in a lecture hall with 300 students. However, the lectures use the content of molecular biology as a means to address student heterogeneity in intellectual maturity and learning style, challenge and support student development, and model scientific thought processes.

Collaborative learning is facilitated in this class through organized learning groups. Three or four learning groups of 4 to 6 students in a room of approximately 20 students are organized by using two Undergraduate Teaching Interns (UTIs) as leaders.

UTIs have mastered the content of the class, but are chosen for their leadership qualities which enable them to encourage small groups of students to construct answers for questions and solve problems on their own. Although UTIs do the type of work that has traditionally been done by graduate Assistants Instructors (AI), in the Biology Department at IU-B we can hire 20 UTIs for the price of 1 AI. 20:1! The quality of their work rates as, "Superior".

A weekly worksheet provides the structure for the learning groups. Students are required to bring their mostly completed worksheet to their learning group meeting. There the group members discuss among themselves and the UTI, especially difficult problems/questions/concepts. Students then add "finishing touches" to their worksheets and submit them to the UTI for grading. Worksheet questions are designed to have similar content ('cousin questions') and to require the same type of thinking skills that are used on examinations. Therefore students are never "surprized" by an exam question. And if they merely copy another students' worksheet answer they will more likely have difficulty with the exam.

L111, Evolution and Diversity, is the first Freshman course for potential biology majors. In L111 the Learning Groups are designed to provide students with a number of advantages:

1. By meeting in small groups on a regular basis students have the opportunity to keep the information fresh and current, instead of being in the position of most students who end up studying the material again just before an examination. This is accomplished by the use of weekly worksheets. The worksheets are handed out in lecture on Friday and consist of short answer essay and some multiple choice questions from that week's lectures.

2. Working in small groups facilitates learning. Learning Groups are organized based upon learning style. During the first meeting students fill out a Myers-Briggs form. Students are assigned to groups to provide a cross-section of learning styles, so that students can learn from others and see how problems can and are approached by different styles. Interacting with other human beings stimulates the thought process and by discussing ideas with others it is often possible to grasp a concept that previously caused difficulty.

3. The learning groups help students develop critical thinking skills. These skills enable students to look at a question or issue from a number of view points and examine the relevant facts, and make an intelligent decision on where they stand and why. While critical thinking is essential in science it is also very important in many day to day issues, and in most other career choices. The group atmosphere is one of the best for developing these skills where information is exchanged in a group context and communication skills are improved. Critical thinking assignments come from the required text and from outside readings assigned in lecture.

4. Worksheets questions are designed like test questions and therefore, provide relevant pre-exam practice. (i.e. BETTER GRADES). The learning group allows students to understand how other students arrive at their answer.

Grades

The learning group constitutes 20% of the final grade. The grade is based upon 1. Completion of the worksheet and/or critical thinking assignment (These assignments must be completed prior to class). 2. Active participation in the group discussion, which means students have to be there. 3. Grading of the worksheet and other assignments.

Biological Mechanisms (L112) is the second course for freshmen students. Associate Instructors (AIs) and Undergraduate Teaching Interns (UTIs) are used to incorporate learning groups into L112. learning groups help students by promoting student interaction with each other in problem-solving, in critical thinking, in improved understanding of concepts and experiments, and in early preparation for examinations. More specifically, the learning groups provide the following:

1. The large lecture class is divided into groups of 25 or 30 students each. These groups are further divided into small learning groups of five or six students. Each group of 25 or 30 students meets once per week under the supervision of two AIs, UTIs or a combination of an AI and UTI. The smaller group meetings help to bring a more personal component to the learning atmosphere of the large lecture class.

2. The learning groups are task-oriented and provide a setting which helps students to develop and practice critical thinking skills and communication skills with their colleagues.

3. The weekly meetings help prompt early preparation for exams by requiring students to focus upon ideas and problems related to each week's lecture topics.

4. Participation in the learning groups is expected to facilitate a better understanding of biological concepts and interrelationships and this should be reflected in students receiving better grades.

There are 12 groups of 30 students which meet during the late afternoon Mondays through Fridays. Each student is assigned to a specific learning group. Attendance is required. Students receive a 5% (5 point) bonus on each lecture examination for participation in their Learning Group. Missing more than two meetings of the group during the semester results in the loss of the bonus points.

L311 (Genetics) is taught much like any large three hour lecture class. A major exception is that students are expected to meet in small groups with other students for collaborative learning.

Collaborative learning is used in L311 primarily to assist students in their understanding of genetics through mastering the process of solving genetics problems. Problem sets related to lecture topics are handed out to students so they can work on them prior to participating in the group.

Students are asked to verbalize their approach to solving a specific genetics problem in a small group setting. The listeners participate by making sure they understand in detail every step and every diversion or error made by the problem solver. A good listener should not only know the route taken by the problem solver but also understand the reasoning used to select that path. This means the listener should ask questions whenever the problem solver's actions become the least bit mysterious. The solver then must respond to the questions. (This technique is adapted from Arthur Whimbey and Jack Lochhead, *Problem Solving & Comprehension*, 4th Edition. Hillsdale NJ: Lawrence Earlbaum Associates, 1986). The end result is that the solvers and the listeners are active in the problem solving process. Further, everyone benefits from the multiple perspectives on problem solving.

The class has an enrollment of approximately 140 students. The students then sign up for one (1 hour) of seven different times for small group work (Problem Solving Groups). The seven groups are managed by two graduate student Assistant Instructors (AIs) and five Undergraduate Teaching Interns (UTIs). Each AI or UTI is responsible for leading one group of 20 students. Each group leader has had training in leading small groups, and each leader is considered to be a content expert for the undergraduate genetics course. A major criterion for choosing Undergraduate Teaching Interns was their outstanding performance in the class as a student.

Evolution (L318) is a new course to being offered for the first time in the

spring of 1992. The course is required of all Biology majors.

The collaborative learning focus of L318 is in connection with a writing component. The writing component is substantial, accounting for over 50% of the final grade. There are 7 written assignments for the semester. The writing assignments require that drafts of the papers be evaluated by peers working cooperatively in small groups.

Writing assignments are of three types:

1) Five microtheme (2 pages maximum) assignments consist of short problems demanding a written response. These are distributed on Mondays of the weeks indicated. A well-written draft is due the subsequent Friday for presentation to a small group of peer students. The peers will evaluate each paper, discuss the proposed problem solution, and suggest changes. A copy of the draft is handed in. The subsequent Monday, a final draft is due to be handed in for grading.

2) A group microtheme (2-3 pages). A small group of peers will produce a report providing an analytical critique of a scholarly study of a single species. This is a collaborative effort. The questions raised will used by the students as a basis for the following paper.

3) A mini-research proposal (5 pages) is to present an experiment or experiments designed to answer one or more of the questions suggested in the group critique in (2) above. In addressing a scientific audience, students must conform to the conventions of a research proposal. They must, for example, synthesize expert opinion in writing the review of the literature and present the design of their projects clearly and persuasively. Since science is a cooperative venture, peer evaluation and collaboration will be encouraged. However, each person must propose a unique experiment or experiments.

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COLLABORATIVE LEARNING IS POSSIBLE IN LARGE COURSES

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Psychology: Life Span Development
200 Students
Lecture hall

Abstract

This article describes a discussion and writing component of a large lecture course (of approximately 200 students). Students discussed in small groups issues relevant to lecture topics five times during the semester. Following the discussions, one-fifth of the students were chosen to write a position paper. Later, another fifth of the students critiqued these papers and the original authors had a chance to revise their work. The writing and discussion component of the course resulted in students' seeing the relevance of course material, writing more critically, and actively participating in the course without increasing instructor/grader workloads unreasonably.

Large Classes

If asked to choose an environment conducive to teaching and learning, instructors would not choose large courses. Large courses are fraught with problems. Faculty feel limited to lectures and multiple choice exams to reduce strain on their limited resources. Students are passive because they do not feel individually accountable. Advocates of collaborative learning suggest that group discussions and writing offer solutions to at least some of these problems (Gleason, 1990; Stevenson, 1989). The challenge to faculty who incorporate discussion and writing into their large courses is to enhance students' understanding of content, involve students, and not place unreasonable workloads on graders, students or themselves. This paper describes one use of writing and discussion in a large course.

Group Discussion and Writing

My large course in Life Span Development is offered to 200 students at the Indianapolis campus. The broad cross section of students who take the course, the majority of whom are nontraditional (minority and returning) students, select it to meet general degree requirements. Although very few of the students are psychology majors, I try to emphasize developmental theories and methods rather than specific, isolated facts because I believe that this approach makes the course content generalizable. This emphasis has caused some students to question the relevance of the course. In order to encourage students to apply theory to practical

situations, I developed a discussion and writing component for the course.Group Discussion and WritingOn each of five discussion days, students came to class prepared with an index card containing an outline of the main points they planned to present in a three page position paper. The students met in small groups to share and discuss their main points. In the last 5 min of the class period students summarized their group's discussion on the back of their outline card, signed it, and handed the card in. On each discussion date, I randomly chose 20% of the students (without replacement) to actually write out their position paper. Two copies of the position paper were due during the next class period. At that time, another 20% of the students were randomly assigned to pick up an original paper, read it, and comment on it. In the third class session following the discussion, the critiquing students turned in two copies of their critique, each attached to the original paper. One of these copies was for me and one was for the original author. The original authors had until the fourth class period to revise their work, at which time they turned in a final paper

Problems in Large Courses and Some Solutions

Seeing the relevance of theory

My original motivation for devising this task was to demonstrate the relevance of developmental theories and research to issues of current social importance. I asked all students to discuss all five topics: teratogens; daycare; prisoner rehabilitation; midlife crisis; eldercare. In the week preceding a discussion, I presented information that would support discussion. For example, after I had lectured on socioemotional and cognitive development in infancy, I asked "Should parents leave infants younger than one-year-old in day care?". Lectures on moral development were followed by the question, "Can prisoners be rehabilitated?". Anecdotal evidence, based on students' self-reports, suggests that the task helped re-entry students to see the relationships more often than it helped traditional students.

Critically Thinking about Complex Issues

Discussion made a significant contribution to the quality of arguments in students' papers. Papers on a single topic (exposure to teratogens {toxins that cause birth defects}) from two semesters, one in which discussion took place ($n = 39$) and one in which it did not ($n = 35$), were rated using Perry's (1970) stages of cognitive development. Papers reflected three levels of reasoning: (1) dualism (there is one right answer), (2) multiplicity (everyone has his or her own opinion), or (3) some form of relativism (there are a diversity of approaches, but I can justify why this is right for me). A subset of 15 papers was rated by a second judge. Inter-rater reliability was high, $r = .87$. Papers written after discussion reflected higher levels of critical thinking,

CHI $(2) = 18.67$, $p < .01$.

Impersonal Atmosphere

Gleason (1990) has suggested that supportive communication climates, in which individuals are recognized and validated, reduce the anonymity students feel in large lectures. To that end, the class of 194 students broke into 20 smaller groups of 10 or fewer to discuss topics. Larger groups typically inhibit the participation of introverted students. Groups were composed of students who did

not know each other before the course began to allow them to increase their number of acquaintances within the class and to maximize the likelihood that a variety of abilities and views would be represented within each group. These small groups did result in increased student interactions. On a questionnaire, 48% of the students from a class with small group discussions reported they met and interacted with others outside of lecture compared to 32% in a section without small groups.

Limited Grading Resources

Each student generated five index cards that were used to give credit for discussion preparation and participation, one position paper (Mean = 2.79 pages), and one critique of another student's writing (Mean = 2.12 pages). The 194 students produced 773 pages of written material that was read and graded by a graduate assistant who worked 10 hours per week through the semester. The graduate student used explicit criteria when grading the papers and critiques. Choosing discussion topics from each phase of the life span meant that as I covered the life span chronologically, grading was staggered throughout the semester.

Global Evaluation

Student satisfaction was measured using a standardized questionnaire, required by the School of Science at IUPUI. Responses to 24 questions are pooled to create a global satisfaction score and three subscales: exams, motivation, and rapport. The global and subscale scores range from 1 (low) to 5 (high). Student satisfaction ratings for four classes in which discussion and writing did not take place and two in which they did were compared. The increase in mean global score from 4.04 (for sections without discussion and writing) to 4.43 (for sections with discussion and writing) corresponds to an increase from the 65th percentile to the 90th percentile on student global satisfaction within the School of Science.

Change in the motivation subscale score accounts for this change in global score. There is ample evidence that collaborative learning techniques can affect students' evaluations of instructors. Sass (1989) found that relevance of course material and students' active involvement were among class characteristics that students said were motivating. Shapiro (1990) found that the evaluations of instructors by both traditional and non-traditional students were higher in classes where term papers were required.

Conclusions

There is no doubt that large courses are challenging to teach. The discussion and writing component I have described is one technique for dealing with students' passivity in large lecture courses. The use of writing and discussion has increased students' satisfaction with the course. But trying to reduce the problems of large courses is not easy and implementation of this component was not without its own difficulties.

One problem with the writing and discussion component was students' unease with any ambiguity within the assignments. They wanted to know, at the beginning of the semester, the due date and topic of their paper and critique. They

resisted groups that were not composed of friends. They wanted to discuss issues that had a "right answer."

The structure I provided to reduce students' discomfort took time and effort which I have not included in my discussion of limited grading resources. It included some additional vigilance before and during classes when assignments were due to assure that the process went smoothly. I also spent some time creating explicit grading criteria for the papers and critiques, which were a relief to both the students and my grader. I think the additional effort is well spent.

On the whole, I found the discussion and writing component beneficial in my large course. It gave my students and me a break from the lecture format, I learned how well my students integrate the course material, students met classmates, and they thought critically about course related issues.

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COLLABORATIVE LEARNING IN INTRODUCTORY BIOLOGY

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Biology 103: Concepts of Biology II - Animals (5 cr.)
100 students

Fall, Spring; day, night. An introductory course emphasizing structure, physiology, development, diversity, and behavior in animals, and evolution and ecology of plants and animals.

Students in preprofessional programs (predentistry, preveterinary and human medicine, preoptometry and prepharmacy) which require two semesters of general biology typically take K101 Concepts of Biology I - Plants (5 cr.) and K103 Concepts of Biology II - Animals (5 cr.). The K101-K103 core sequence is designed specifically for students majoring in biology and is also the recommended route for students pursing advanced work in other scientific fields (chemistry, geology, and physics). I was named professor-in-charge of K103 in the summer of 1988; it is this course which has been redesigned to incorporate collaborative writing into the classroom and to use it for student evaluation.

Course Organization

Students (≈ 100 each semester) enrolled in K103 during the academic year register for lecture, recitation, and laboratory sections. Two 75 minute lectures are given weekly by the professor-in-charge; slides, overheads, and the microphone are routinely used in a large lecture setting. Handouts (including lecture outlines, learning objectives, and figures and tables duplicated from a variety of sources) are prepared and distributed to the students for most, if not all, of the lectures. Each week each student also attends one 50 minute recitation section (recitation sections are designed to review lecture and/or laboratory material and to give the student an opportunity to ask questions in a small group setting) and one three hour laboratory section. Grades are determined from the scores of 3 lecture examinations each worth 100 points, 3 laboratory practical examinations worth 200 points, and a set of 5 recitation quizzes worth 100 points. The total number of points possible to earn is therefore 600.

Introduction

On October 22, 1989 I attended the Addison Locke Roache workshop "WRITING TO LEARN: USING WRITING IN ALL OUR CLASSROOMS" coordinated by the Intercampus Committee on Writing and Writing Assignments. As a result of that experience, I became interested in seeing if we could get our beginning biology students to critically read scientific literature...not just to read it, but to understand and write critically about it. In addition to factual knowledge, scientifically literate college students need analytical skills to interpret, apply, and communicate their scientific knowledge. For research scientists, analytical skills are essential in writing, critiquing, revising and defending research proposals and articles, and for reviewing the research of others. Critical thinking and writing are

activities integral, rather than peripheral, to scientific research. Students need to be introduced to these analytical skills early in their careers.

Collaborative Learning Activity

As I understand it, collaborative learning refers to students working together to make discipline-specific concepts more meaningful; that is, working together results in a greater understanding than would have occurred had the students worked independently. I have become excited about an approach that gives beginning biology students a format for evaluating and analyzing scientific literature in a collaborative learning setting. An article by Barbara J. Kuyper "Bringing up students in the art of critiquing research" (Bioscience 41: 248 - 250. 1991.) offers a way to prepare students to look critically at scientific articles using a check list---what should appear in the introduction, materials and methods, results, and discussion sections of a scientific paper. It then asks students to evaluate the article in terms of the statement of purpose at the end of the introduction. It seemed to me that these critical thinking and writing skills could be learned best in a collaborative group setting.

Kuyper's Checklist (abridged) for Critiquing a Research Article

Introduction

1. Read the statement of purpose at the end of the introduction. What was the objective of the study?

Methods

1. Review all methods in relation to the objective of the study. Are the methods valid for studying this problem?
2. Check the methods for essential information. Could the study be duplicated from the information given? Review the methods for possible fatal flaws. Is the sample selection adequate? Is the experimental design appropriate?

Results

1. Scrutinize the data as presented in tables and illustrations. Does the title or legend accurately describe content? Are the data organized for ready comparison and interpretation? Review the results in light of the stated objective. Does the study reveal what the researcher intended?

Discussion

1. Check the interpretation against the results. Does the discussion merely repeat the results? Does the interpretation arise logically from the data, or is it too far fetched?

Overview

1. Consider the journal for which the article is intended. Are the topic and format appropriate for that journal? Reflect on the author's thinking and writing style. Does the author present this research logically and clearly?

Collaborative Learning Assignment

1. Read the article by Barbara J. Kuyper "Bringing up students in the art of critiquing research" (Bioscience 41: 248 - 250.

2. Using Kuyper's checklist for critiquing a research article, analyze and prepare a 1500 to 2000 word **group** report on one (or more if necessary) of the following papers that has been placed on reserve in the University Library.

McCracken, R. O. 1978. Efficacy of mebendazole and albendazole against *Trichinella spiralis* in mice. Journal of Parasitology 64: 214 - 219.

McCracken, R. O., D. M. Nierste, J. Moss, and A. Garcia. 1984. Oxfendazole: regimen-dependent expression of drug efficacy against *Trichinella spiralis*. International Journal for Parasitology 14: 277 - 281.

McCracken, R. O., A. Garcia and H. G. Robins. 1982. Mebendazole therapy of enteral trichinellosis. Journal of Parasitology 68: 259 - 262.

McCracken, R. O., and D. D. Taylor. 1980. Mebendazole therapy of parenteral trichinellosis. Science 207: 1220 - 1222.

NOTES: At the beginning of the semester the 25-30 students in each recitation section were arbitrarily divided into smaller groups of 3-4 and told they would be working together on a writing assignment . The articles selected for student analysis reinforced the biological concepts presented in lecture on the treatment and control of this parasitic infection and were thought to be of particular interest to preprofessional students.

Evaluation

I cannot tell you now how successful our collaborative learning approach to the teaching of critical thinking and writing skills has been; this is my first experience with the project. However, students in the School of Science at IUPUI evaluate the courses they are taking each semester; I will ask my students in Biology K103 to comment on the collaborative learning experience. In the past their constructive criticisms have been most helpful to me in developing writing as a central mode of learning and evaluation in Biology K103.

COLLABORATIVE LEARNING IN AN UPPER DIVISION MICROBIOLOGY COURSE

Deborah Ross
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Biology 438: General Microbiology
20-25 students
Small classroom

Background Information

The class is an upper division microbiology class for biology majors who already have had two years of a core biology curriculum. The class size was 21 students. The class is held in a normal classroom with seats for about 40 students.

Collaborative Learning Activity

At the beginning of the semester, the students were arbitrarily divided into groups of 5-6 students and told that they would be working on assignments within these groups. Approximately once per week, the students were given a series of three to five questions to prepare for the next class. At the beginning of the class period, they moved their chairs in small circles and worked within their groups to provide a groups answer to each of the questions. They were given 20-25 minutes to complete their answers and hand them in for a grade (5 points per assignment). The remainder of the class period was spent in discussion of the answers to the questions.

Positive Factors

By selecting appropriate questions, I could cover major topics in a discussion format rather than a passive lecture. Students with less preparation or with less well developed study skills could learn from better students.

Negative Factors

After one or two meetings, it appeared that the better students within each group were preparing answers prior to the class period, and the groups were handing in these answers as their group effort. The format had to be changed slightly---I only accepted answers that were written on paper that I handed out each class period. An additional problem was that one or two students skipped class until the group assignments were almost completed, missing the group effort but receiving a grade. As soon as these students realized that they would not receive a grade for assignments in which they did not participate, they complied with the assignments.

Overall Evaluation

I haven't yet received the results of the student evaluations, so I don't know how the project was perceived by the majority of students. The students appeared to have some problems adjusting to the project, but once it had been in operation for a few weeks, they appeared to enjoy it. They were much more compliant when they realized that some of the questions appeared in modified form on the exams. There were a few students who appeared to be rather resentful of the approach, and

unfortunately, they all were in the same group, so that groups did not do as well as the others.

COLLABORATIVE LEARNING IN A GRADUATE LEVEL BIOLOGY CLASS

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Biology, IUPUFW

Biology 589: Fundamentals of Toxicology
10 students
Small classroom

Background Information

This class is taken for 8-10 advanced undergraduate (usually seniors) or graduate students. Students have had a core biology curriculum plus several upper division biology courses, plus chemistry, physics and math.

Collaborative Learning Assignment

One of the most interesting aspects of toxicology is how scientific information is used to make decisions by regulatory agencies and the general public. This is the most difficult aspect of the course to teach, so I thought that it would be a good subject for a collaborative assignment in which the students would have to interact to arrive at a consensus on a toxicological decision. I selected the issue of pesticide safety. I asked each student to gather information on the health and environmental effects of one pesticide from a list selected by the students themselves. Then I asked the students to arrive at a group decision on whether or not pesticides posed unacceptable risks to human and environmental health. I allowed the class to work on the collaborative part of the assignment during several class periods scheduled throughout the semester.

The students performed very well in obtaining information about their own pesticide and in summarizing and commenting on that information. They dropped the ball in terms of a consensus decision, and gave instead a rather general summary that didn't really get to the meat of the issue. I believe that this could have been corrected by more guidance on my part. I attended the first two collaborative sessions, but found that my presence was inhibiting the students from expressing their own opinions---they kept looking to me for guidance and approval. After the second collaborative session, I did not attend any of them, but asked the class for a report the following class period. I believe that closer surveillance would have enabled me to keep the students on track. Another problem was the general nature of the question. Perhaps a more focused questions would have prompted the response that I wanted.

THE FLOWERING OF COLLABORATION BY CHANGING THE STRUCTURE OF A PHYSICS COURSE

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Physics, IUB

Physics 221-222: Physics I and II
100-120 students
Auditorium and regular classrooms

Ask a physicist whether physics teaching is collaborative. Two answers spring to mind - no and yes - perhaps in that order. We first think of all those classes in physics where we teachers of physics transmit the facts of physics to our students. There doesn't seem to be much collaboration there. Then, we remember all the other ways we work with our students. We recall all the observations we make and experiments we do, together with our students. We recall all those good discussions with them about how things work, and how we and they might change an experiment to help answer a new question. The very essence of the field seems to be collaborative.

This paper examines an experiment being done here at Indiana University. The experiment is based on an hypothesis that collaborative learning is natural to physics and physics learning and that making certain simple structural changes in a particular physics course will allow the flowering of highly effective collaborative learning among our young physicists in that course.

In the olden days there was the famous transmission model of physics teaching where professors expounded and students absorbed. This model was taken as the standard. In the classroom the flow of information was one-way, proceeding from teacher to student. The elite scientist deigned to pass absolute truth on to the masses on the outside. To the outsider looking in this "truth" was often thought of as the magnificent list of discovered facts of the field and sometimes, the field itself was thought of as the sum of these facts. Collaboration wasn't mentioned very often in those days.

Though clearly an exaggeration the above picture is not terribly far from a common perception of physics teaching today. Inside the field this older view is rapidly being replaced by a far more collaborative view of learning and research. On careful examination we see that physicists have routinely collaborated in research and in education and that such collaboration has been an essential part of the successful enterprise since its beginnings. Even Isaac Newton acknowledged the value of collaborators in physics when he said, "If I have seen farther than others, it is because I have stood on the shoulders of giants." Therefore, we hypothesize that collaboration is historical, effective, and fully appropriate in physics and in physics education.

The Experiment

In this paper we wish to focus on collaboration in the learning of physics. In particular, we relate the story of a major experiment on ourselves and our students. Such an experiment is under way in the teaching of our calculus based introductory physics course here at Indiana University. The experiment begins with certain structural changes in this course. These structural changes invite substantive changes in our approaches to physics teaching and in particular allow us to participate in a full measure of collaborative learning in the class room.

Underlying our efforts to make major changes in the introductory physics course were two things. First, the number of physics majors at Indiana University had been quite small, averaging some 10 a year. Second, in discussions with our majors, we heard persistent complaints, two of which were:

1. Our undergraduate curriculum was not collaborative. Students were not encouraged to work together to teach each other physics.

2. Our undergraduate curriculum was not student centered. We often didn't even know our students' names. No discussions were held in class about careers in physics, about our research, and how our research might involve our students. Little attempt was made to bring our students into the life of our department. Their ideas were not valued.

Structural Changes

We began with four changes in the mechanics of our elementary physics course. First, the format of the course was changed from four lectures a week to three lectures and two discussion sections a week for each student. The discussion sections are kept small. Second, two faculty now collaborate on the teaching of the course. Third, the number of physics topics has been reduced substantially, and fourth, calculus is now a co-requisite for the course, not a prerequisite. All of these changes help to provide more time to work collaboratively toward the common goal of creating physicists. We break the description of our collaborative efforts into three sections, faculty-faculty collaboration, student-student collaboration, and finally student-faculty collaboration.

Faculty-Faculty Collaboration

Two faculty members are now assigned to this introductory physics course. As an example of the social construction of knowledge, novel ideas and approaches to teaching physics have come from discussions among the faculty involved. Each part of each course is developed, coordinated, and reflected upon in collaboration. All aspects of the course receive the joint attention of the faculty including the progress made by each student in the course. New parts of the course can be attempted with joint enthusiasm and reinforcement. For example, new laboratory exercises are regularly developed. Even joint lectures become a possibility where students see their faculty as role models of collaboration in physics.

Student-Student Collaboration

Groups of two to four students are actively involved in problem solving during the small discussion sections. As much as half the class at any moment is teaching the other half. Each student becomes fluent in the language of physics. Study groups are spawned in discussion sections and continue outside of class. Students

bring different experiences to bear on common problems, and in the process begin to form collegial relationships with their fellow students. Uri Treisman's successful experience with multicultural collaborative learning in mathematics at Berkeley encouraged us to consider seriously collaborative learning in physics at Indiana University.

From each of the small groups a presenter then outlines ideas for an entire discussion section of 25 students. Each student becomes a presenter several times a semester. As presenters our students began to get experience in a more formal means of communication in physics similar to presentations at meetings. They were also asked to lead the discussion of ideas that emerged. Other students were then willing to be risk takers, entering into the discussions.

The faculty members were both collaborators and facilitators, who visited one group after another asking questions and contributing ideas. They were no longer "experts" but rather learners and teachers with the students. Student ideas and approaches were valued and discussed and the venerable transmission model was no longer needed. The faculty then had time to concentrate on learning as much as possible about their students, their interests, their difficulties, their questions, and their capabilities. A student centered curriculum emerged.

Student-Faculty Collaboration

As soon as students begin doing physics in this introductory course, they are doing the same things that physicists do, and can now begin to think of themselves as physicists. They are our collaborators in the enterprise of the creation of physics knowledge. In the newly structured course there is time to bring them into the "thought collective" or family. There is time to discuss careers in physics and the kinds of things they can do with a B.S. in physics. We can convince them not only that they make useful contributions to the field of physics, but that we badly need them in the field. Their ideas are valued and their contributions sought by us.

We encourage them in this direction by inviting them to participate with us in all the things physicists do such as attending teas an colloquia, and getting together with other majors to discuss interesting Physics at places like the new Physics majors' room or the Physics Club. Discussion periods are ideal for discussing recent breakthroughs in the field or current research you are doing. The students enjoy getting involved with department activities such as the Science Open House. There is time to read recent journal articles and discuss them in class, and even time to discuss summer opportunities for physicists like them. Of course, the extra time can be used to advantage to help individual students with a forgotten calculus idea or two.

Best of all we find as a faculty member that we have time to get to know our students well. This, perhaps more than any other thing, helps them to think of themselves as physicists.

Difficulties Encountered

In a collaborative physics environment all is not sweetness and light. There are difficulties. I mention the most persistent ones here.

1.) With two faculty come two sets of ideas about the course. We have different ideas about the choice of topics, choice of laboratory exercises, pace of the course, and kinds of problems. (Our response: Such a course takes lots of planning, talking and coordinating. The faculty time spent is as large as doing the course alone.)

2.) Students sometimes play one faculty member against the other for grades. (Our response: A clear delineation of final grade responsibility for each part of the course is needed.)

3.) Some duplication of effort takes place. Regular meetings are needed, attending each other's lectures and discussions helps, and both must get to know all the students. (Our response: It is worth the extra time.)

4.) The lecturing person doesn't get to know the students as quickly as the discussion person. (Our response: Switch back and forth often, perhaps once every two or three weeks.)

5.) Students under pressure from less collaborative courses decide to exploit the system, letting others do all the homework for them. This can lead to their failure. I find 2-3 each semester who begin this way. (Our response: Discuss this with the students whom you identify in this situation and keep a sharp eye on their weekly performance.)

6.) Assigning two to a course is a highly intensive use of faculty. (Our response: That's right, it is an intensive use of faculty. The Physics Department has decided that it is a good use of its resources.)

7.) Students sometimes feel that it is a waste of their time to listen to other students' explanations when the faculty member's explanations are "better". (Our response: This is a valid point. It needs study. However, in my experience, active learning ultimately lasts longer than passive learning.)

8.) Student presentations take much longer than faculty presentations, so fewer problems or examples are "covered" in a discussion class. (Our response: It does take more time. This is one reason that having two discussions a week is so valuable.)

9.) Will such a collaborative technique, which works well with highly motivated Physics, Chemistry, Math, and Computer Science majors, work with students who are **required** to take a physics course to complete a requirement such as premedical students? (Our response: Let's try it, and see.)

Summary

An experiment with our introductory physics course is underway. It is based upon certain structural changes including the use of two faculty members, two discussions a week, fewer subjects covered, and calculus as a co-requisite. These changes free time to substantive changes in the way the course is conducted. The

time is being used in collaborative efforts between the two faculty teaching this course, in collaboration among the students both in and out of class, and in bringing these students into our world of physics. Anecdotal evidence of the success of the experiment is wide spread. As collaborators we and our students are beginning to understand how physicists are made.

This paper discussed the collaborative nature of our experiment in teaching this elementary physics course. A fundamental rearrangement of priorities of the course establishes a structure with considerably more time for collaborative learning, both among students and between our students and ourselves. The results of the experiment are not yet in. However, as in all concerted efforts to improve a situation, the students and we share a sense of excitement about the outcome of this experiment.

AN APPLICATION OF COLLABORATIVE LEARNING IN A COURSE ON URBAN ECONOMICS

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Economics 323: Urban Economics
10-20 students
Lecture/Discussion

Introduction

Most students will find themselves, upon graduation, working in environments in which they spend a great deal of time working as a member of a team. In these teams, they will have to face issues of working with others to define problems, to structure approaches to these problems, to integrate work done to solve the problems, and to present the team's solution to the problem. Students generally must acquire these skills as a part of courses that address specific content areas. However, the assignments that we structure for them generally call for students to work independently.

Students confronting assignments so structured will generally have insufficient opportunities to learn to work in teams. Particularly for students majoring in business, assignments that do provide a team-based problem-solving structure will allow them to acquire valuable post employment skills. As a result, team activities have long had a central place in many business courses.[4] However, economics faculty members, even in business schools, have not adopted team-based (collaborative) approaches to assignments as rapidly as have other business faculty members.[5] In many economics courses, however, collaborative activities can make a real contribution both to developing post-employment skills and to providing students with a deeper appreciation for the material.

The Setting of the Project

I have developed a collaborative project for use in a course in Urban Economics (E323), an upper-division economics course in which students generally have selected either economics or business as a major. I run the course largely as a lecture/discussion class, with individual assignments and tests leading to the collaborative project as the culmination of the semester's work. This semester, I have 12 students in the class.

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4. In placing emphasis on post-college, employment-related skills, I do not mean to down-play the learning-theoretic aspects of team activities.
5. I think the emphasis of economic theory on competitive activities can account for this.

The Project

The key theoretical element in urban economics is an understanding of the location decisions made by business firms. Such decisions, in practice, are generally quite complex and frequently require substantial amounts of firm-specific, and quite confidential, data. The models presented in textbooks generally reduce the number of factors considered to a manageable few, and deal with the remaining complications quite cursorily. As a result, a student whose contact with location theory and location decision-making comes only from textbook discussions generally has only a limited grasp of the intricacies and complexities involved in making location decisions in practice. In fact, no classroom situation can satisfactorily capture the depth and complexities of actual location analyses.

However, we can put students in a situation in which they can experience these difficulties. We can do this by structuring a location problem for them and asking that they gather the data, perform the analysis, and make a location recommendation. As I has set up the problem, it has the following steps:

1. Statement of the problem. I assign each student to a team. Each team has a location problem to solve. For example, a team might be asked where in Lake County, Indiana, the Dayton-Hudson Corporation might best locate a new outlet for its Target stores chain. Note that I specify the type of store and that I restrict the range over which the team must search for an optimal location. This substantially reduces their data problems.

2. Structure of the problem. During the course of the semester, the students have studied various models of manufacturing, retail, and service sector location decision-making. Faced with a specific location problem, the students must themselves structure the problem so that they can address it successfully. For example, they may break the problem down as follows:

a. What location model is most applicable?
b. What data does this model require that we obtain?
c. How does this model suggest that the data be manipulated?
d. What interpretation can we give to the outcome of the analysis?

3. Assigning responsibility for tasks. The students on each team must divide up responsibility for completing the tasks required for solving the location problem. They must also monitor each other's efforts, to assure that they will be able to complete the assignment on time. Finally, they must deal with the issue of coordinating their efforts and integrating these efforts into a final report in which they present their solution to the problem.

I serve as a consultant to the teams, assisting them with identifying and locating data, with access to computers and other tools needed for their analyses, and with preparing any visual aids for their in-class presentations.

Evaluating the Projects

I evaluate teams, not students, on the completion of the project. I base the evaluation on two things. First, each team presents its location analysis and recommendations to the class, treating the other members of the class as (for example) the upper-management of the corporation for whom they are "working." I examine their presentations for clarity and completeness. Second, each team turns in a written report on its location analysis. I examine these for the use of the appropriate data and analytical techniques, clarity and completeness of presenta ons, and absence of distracting factors (such as errors in grammar, spelling, c.).

I also ask each team member to evaluate the contributions of the other team members. I see these evaluations, while the other team members do not. Should members of a team indicate that one (or more) members of the team failed to carry his/her share of the burden, I talk with the team members involved and, if necessary, make appropriate adjustments in credit. (I have never actually had to make any adjustments, however.)

COLLABORATIVE RESEARCH TEAMS

Linda Haas
Sociology, IUPUI

Sociology 251: Research Methods
15-25 students
Class set-up: Discussion

Background

Social Science Research Methods is a required course for sociology majors. Other students may elect to take the course to fulfill departmental requirements in political science, public and environmental affairs, and marketing, or to complete a minor in sociology. Weekly quizzes (requiring students to apply course material) are given in lieu of midterm and final exams. Individual homework exercises are assigned, as are some class exercises to be completed by small groups.

Rationale for Approach

Students approach this class with suspicion and dislike from the first day, for two reasons. First, they are mystifed about how social scientists do research and doubt that it is possible for social scientists to collect information in an objective fashion. Secondly, while they typically like sociology classes, they view this one negatively because it does not clearly focus on a particular substantive area within sociology. I believe these problems face any instructor teaching a methods course in a social scientific or scientific discipline.

My solution to these problems has been to give students an opportunity to experience firsthand the challenges, problemsolving, and satisfactions involved in doing research on a substantive topic. Research teams are formed to work collaboratively to develop, carry out, and report on a research study conducted within the semester. Collaborative research teams can be used in a wide variety of courses in the social sciences and in the sciences, to teach students how a discipline investigates original research questions.

I have chosen a collaborative approach because research is typically a collaborative activity in real life. Teams of researchers often conduct research. We depend on the work of earlier researchers and colleagues for guidance in the formulation of our research questions, in the selection of our research design, and in interpreting our findings. Colleagues review our designs at the stages of funding, assessment of risks to human subjects, and publication. By having students conduct research in a collaborative group setting, I hope they will come to realize the importance of collaborative work in doing research and how collaboration serves as a safeguard against bias and potential harm to subjects. Working in a group also give students an opportunity to interact with students who may help them master textbook material. Friendships are also formed in these group settings, which are often difficult to develop on an urban commuter campus.

To help connect this course with students' substantive interests in sociology,

the research teams pick specific sociological questions to research. In this setting, they can learn how knowledge about their favorite topics is generated by research. They also benefit from fellow students' past study of the topics as well.

Procedures

1. The class is divided into collaborative research teams of 4-6 students each, based on their substantive interests in the field of sociology. (One semester these were gender, race relations, politics, crime, family, sex.)

2. Class time is used to allow groups to develop more specific research questions in these general areas. (E.g., how has the AIDS epidemic affected college students' sexual behavior? What type of political system is more likely to provide a higher standard of living for its citizens?)

3. After an orientation to the library, students conduct a review of the academic literature on their research question. They are instructed to use their review to refine their questions more, to develop testable hypotheses, and to select a research design.

4. Class time is used to make collaborative decisions about methodology. The instructor is often invited to respond to these decisions and serves as a resource person. Class progress reports allow other class members to give opinions about research design. An outline of tasks to be completed is handed out by the instructor, which parallels the topics taken up in the text and covered by weekly quizzes.

5. The research design must be approved by the instructor before data collection commences, as a check for potential harm to subjects.

6. Once data are collected, the instructor teaches individual students (1-2 per group) how to enter data on the IUPUI mainframe computer, and how to analyze it with the statistical package, SPSS.

7. In writing a final report, individuals are assigned by their group to draft a particular section, and then each section is read and edited by the rest of the group. The instructor also reads drafts and makes comments if asked. A final oral report is made to the class, which offers comments on the projects. The final report is due the same day as the final exam would have been scheduled.

8. Individuals are asked to write a report about the relative contributions of group members to the project. They are handed in to the instructor, and used in deciding final grades.

Problems and Solutions

1. Students worry that the project will not be done in time. The instructor-written handout lists dates for which certain steps should ideally be completed. There is also about a month left after quizzes and reading are done before the paper has to be turned in. All groups manage to get their papers in on time, although not all take advantage of my offer to read paper drafts.

2. It takes some time for groups to work effectively, and student sometimes

express apprehension at the onset that group work will be difficult. I spend time studying group interaction during meetings and I make suggestions for change (e.g., when someone was being too bossy, I suggested that everyone comment on an issue before another person could speak; when a student was not attending regularly, I met with the student to discuss the difficulties that this caused the group). I encouraged students to see me privately if there were problems with group dynamics, and some did. In the end, all individuals in the class were pulling their weight.

3. Group size is important. A small group is better than a large group. One group with 7 members had the most difficulty because it was easy for no one to feel responsible.

4. It is impossible for students to conduct the most scientific studies in the small time allowed. (Random samples were the most difficult to obtain.) They had to be encouraged to view time and money constraints as part of all projects, and to recognize the limits placed on their findings by variations from the scientific method.

USING COLLABORATION ON CASE STUDIES TO FOSTER CRITICAL READING, WRITING, AND THINKING

Sharon L. Pugh
Language Education, IUB

Education X401/L501: Critical Reading and Thinking in the Content Areas
25 students (2/3 undergraduates)
Regular classroom set-up

Rationale

In a course for students preparing to teach critical reading in various content areas, an emphasis is placed on reasoning from multiple perspectives as a strategy for understanding complex issues and addressing open-ended problems. The course may be taken for undergraduate or graduate credit, and usually the enrollment is about twenty-five students with a two-to-one ratio of undergraduates to graduates. To accommodate this diversity in both subject areas and levels of study, the curriculum centers on the development of students' own language and thinking processes while they design applications to their teaching. Within this framework, "dialectical reasoning" as explicated by Paul (1985) is a guiding concept that brings together the notion of multiple perspectives and the importance of social, collaborative aspects of learning.

Collaboration as a Learning and Teaching Strategy

An important resource in this course is Bayer's (1990) Collaborative-Apprenticeship Learning model, summarized below.

Beliefs of The Collaborative-Apprenticeship Model

Adapted from Ann Shea Bayer (1990)

1. Learners are actively attempting to make sense out of their world, using their background knowledge as a frame of reference form which to generate hypotheses.
2. Working in collaboration with an instructor and peers within an apprenticeship process, learner construct knowledge beyond what they could do independently (Vygotsky's Zone of Proximal Development).
3. Language is used as a tool for learning.
4. Students develop language and thinking competenciesby using these processes regularly for meaningful problem-solving tasks.

Strategies:
A. Start with what students know.
B. Share that prior knowledge.
C. Build on that knowledge collaboratively.
D. Embed language as a tool for learning throughout the

process.
E. Increasingly support student initiative.

This model supports both collaboration and the gradual increase the students' share of responsibility for the learning of the class. An important metaphorical concept in this process is scaffolding, a strategy whereby the instructor provides clear models and guidance in an activity and then gradually withdraws these as students' initiative and ideas take over.

Using Case Studies in Collaborative Learning

Over the past few years, an effective vehicle for fostering dialectical reasoning has been the use of case studies of problematic teaching situations in which a number of opposing but valid viewpoints come into conflict. An excellent source for such cases is Greenwood and Parkay's (1989) book of case studies for teacher decision making. The issues dealt with in the cases, such as censorship, grading, standardized testing, and student rebellion, provide excellent opportunities for rehearsal as well as the means for exploring viewpoints counter to one's own. Working in collaborative groups, students have analyzed the different viewpoints represented in these cases, with an emphasis on understanding the complexity of each issue. Hence, the assignment is to construct at least two opposing arguments and suggest a resolution that takes both viewpoints into account.

In a more recent development, however, the emphasis has shifted from these provided cases to cases that students write themselves in collaborative groups of three or four. In order to write a case, each group must choose an issue for which there are several opposing but valid perspectives, research at least three of these, and develop a scenario for the rest of the class which presents true dilemmas like those that might arise in a classroom or school. The authors of the case also create the instructions for their classmates to respond to the case, the only proviso being that they must engage in reasoning from different viewpoints. Responses may be shared with some or all others in an electronic classroom environment. After students have responded to the case, the collaborative group presents a 45-minute overview of the issue and discusses the case with the class. Each group keeps a log of activities and conducts a group and/or self evaluation of the collaborative activity to be given to the instructor for her evaluation.

In the following discussion, I will share some of the cases and responses to cases I have obtained from students who took the course in the fall of 1991. In this class, eight cases were collaboratively produced, dealing with the following issues:

> Case 1: "To Be or Not to Be:"[6] An English teacher wants to put a low-tracked boy from a disadvantaged background in her honors class because she believes he has a gift for creative writing, but her decision is overruled by the school counselor and a math teacher who think he would be unable to handle the competitive atmosphere. A few months later the boy drops out of school.

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[6]Authors are undergraduates Charlotte Austgen, Michelle Love, and Karen McDaniel

Case 2: "The Right to Understand:"[7] A suburban high school with an increasingly multicultural student body hires a highly qualified African American biology teacher from a southern state. Parents of about 30 white students request to have their children removed from her classes because they claim they can't understand her dialect.

Case 3: "The Conflict in Contrasting Dialects:"[8] In a suburban school, several teachers argue about the extent to which an African American student, a recent transfer from the inner city, should be held accountable for using standard English across his subjects. The issue centers on how he should be graded.

Case 4: "Computer Clash at Computo-Tech:"[9] An experimental program making intensive use of computers is challenged by parents who want their children to stick to the "basics" before getting involved in technology and by teachers who are computer-phobic or uncertain about computers as a tool for learning.

Case 5: "Speaking Different Languages:"[10] A small rural elementary school with declining reading test scores is in the process of hiring a new fourth grade teacher, and the current staff discusses the pros and cons of the finalists, who espouse different language arts teaching philosophies.

Case 6: "Is Whole Language the Answer?"[11] An innovative and experienced teacher who embraces a Whole Language teaching philosophy is hired to bring new life to the reading program of a suburban elementary school in a community that has close school-parent ties. Conflict occurs when parents find her methods too different from their expectations of school learning.

Case 7: "It's a Judgment Situation:" [12] An experienced English teacher has her students write poems in response to a

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[7] Authors are graduate students Kathy Bussert and Mary Ann Nickel and undergraduate Andrea Webber

[8] Authors are undergraduates Debra Greenbaum, Angie Mills, and Susan Wright.

[9] Authors are undergraduates Catharine Springer and Theresa and graduate student Fukumi Matsubara

[10] Authors are undergraduates Angie Jerrels and Kelli Stern and graduate student Sheila Minczewski.

[11] Authors are undergraduates Laura Carl, Amy Russell, and Stacy Spickard.

[12] Authors are undergraduates Julie Poe, Lori Reiber, and Jenny Wolfe.

painting. After completing this assignment, a student who has written a praiseworthy though somber poem attempts to commit suicide. His parents accuse the teacher of arousing negative feelings with her creative writing assignment while others wonder whether she shouldn't have detected depression in the poem.

Case 8: "The Dissection Dilemma:"[13] When he requires students to dissect worms, frogs, and cats, a biology teacher meets opposition from a student from an animal rights perspective, who must take this class because eventually she wants to be a veterinarian. Others express a range of views both for and against dissection of real animals.

As these cases show, students are both imaginative and perceptive in constructing cases that ring true and present authentic dilemmas. It is noteworthy too that some of the cases, for example the first and the seventh, entail painful moral ambiguities, while the third and the fourth take on serious issues of multiculturalism, thereby opening discussion on attitudes to diversity that might be resisted had a teacher attempted to initiate it. Indeed, the fact that the issues are generated from the students is a major strength of this assignment. Not only does it mean that students will deal with difficult topics on their own terms, but it gives the class a quality of openness and genuine student control that fulfills the highest aspirations of collaboration.

Also, in the course of responding to these cases (and the model cases from Greenwood and Parkay as well as from a previous class), students developed their ability to argue from conflicting viewpoints and devise solutions that acknowledged the legitimacy of varying perspectives. To provide a closer look at the actual writing and responding that the assignment entails, I will present here one case in its entirety along with a sampling of responses to it, following which I will discuss the possibilities they provide for looking at students developmentally across the semester and in comparison with each other. The case I have chosen to present is the seventh because all of its authors are undergraduates and because it deals with an extremely sensitive area of teacher vulnerability -- one that an instructor might hesitate to present to pre-service teachers though we can see it is of concern to them.

It's a Judgment Situation

Wyoming High School is in a suburb of Cincinnati. It is a middle to upper class community that is the home of well-educated citizens who support the strong school system and are very open to new ideas. The community is small, only about 9,000, and the class [first year, second year, etc.] sizes are around 140. The teachers are closely involved in their students' lives and they care about what happens in the community.

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[13]Authors are undergraduates Alice Robertson, Jennifer Swift, and Laura Wilborn and graduate student Tom Theisen.

Mrs. Smith is the junior English teacher. She has been teaching at Wyoming for almost ten years and has earned herself the reputation of a good teacher, one that tries new and imaginative things in her classroom. She had the students write a poem about a painting that she brought in for her classes.

Greg is one of Mrs. Smith's students. He is a good kid and he has a really strong group of friends. He is quiet and reserved and he likes to read a lot. Mrs. Smith thinks he is a gifted student with a talent for writing. However, over the winter break, Greg tried to commit suicide. Everybody was shocked, and they wondered why he would try to do something like this, and if there had been any kind of warning.

Today the CORE team of the high school is meeting to discuss the case. The CORE team is a group of teachers who work with the school counselor, Mrs. Maslow, to handle student problems that he teachers discover in the classroom. They serve as the link between the students, the school, and the professional community that is trained to deal with problems. The CORE team consists of the nurse, Ms. Nightingale, the principal, Mr. Jones, and a few teachers: Mr. Blake from the English department, Mrs. Washington from the social studies department, and Mrs. Mathews from Math. In the meeting they talk about Greg's problem because his parents are blaming Mrs. Smith and her creative writing assignment for Greg's attempted suicide....

Mrs. Maslow: You all have a copy of the poem Greg wrote during class. I'd like you all to read it and then we will discuss the implications of suicide in it to decide if they are blatant enough for Mrs. Smith to have recognized. Mr. Blake, since you are from the English department, I'd like to hear your interpretation of this poem first. What do you think?

Mr. Blake: There is a definite tone of depression, but there is no obvious indication of suicidal tendencies.

Mrs. Mathews: There is no solemn attitude within the painting, though. Don't you think that this poem is saying something? It obviously is not about the painting.

Mr. Blake: It was a creative writing assignment. We can't forget that. He could have just wanted to dig for something that was a little less obvious and more challenging. These dark colors could have been an inspiration for his darker thoughts.

Ms.Nightingale: Even though there is nothing hinting suicide, there is a definite depressing attitude in this poem, and I think Mrs. Smith should have just brought it to our attention, as a precaution.

Mrs. Washington: That's easy to say after the fact, now that we know what has happened.

Mr. Jones: We must remember that Mrs. Smith has been here for ten years, and she never had a problem. If it were a new teacher and the assignment was very bizarre, then maybe we could blame the teacher. Well, we have asked Mrs. Smith to tell us her side of the story and her thoughts of the poem.
(Mrs. Smith comes into the room. It is clear that this whole situation has upset her tremendously).

Mr. Jones: Mrs. Smith, we think that it is only fair for you to get a chance to express your feelings about what happened with Greg and tell us why you dealt with it in the manner that you did. We are not accusing you of anything, but the Browns think you are responsible, and we'd like to hear what you have to say.

Mrs. Smith: Greg is the last person I would have expected to try to kill himself. I thought his poem was wonderful and very thought-provoking. He has a wonderful way of expressing himself. I thought he was just able to see something in the painting that no one else could see. A lot of the students found different things to see in the painting other than the landscape that the artist painted.

Mrs. Mathews: But Mrs. Smith, weren't you at all concerned about the depressing tone of the poem?

Mrs. Smith: You all know Greg. He has a good family and a great group of friends. He is a quiet kid, but in my class he has always been very expressive and creative. I figured this was just a creative outlet for thoughts he wanted to make and play with.

Mrs. Maslow: Greg did seem like a strong person. Unfortunately we cannot change what happened, but Greg's parents are blaming this assignment for the attempted suicide.

Mr. Jones: They are very angry and distressed, and they want something done about what happened. They're here now. (He brings them in.) Thank you for coming today to address the problem. What would you like to say to the CORE team?

Mrs. Brown: (She is very upset and soon her talking becomes hysterical.) Isn't it obvious why we are here? Haven't you read the poem? This was a blatant cry for help and a message of suicidal tendencies. Greg never would have felt this way if it hadn't been for that awful assignment in his English class. It made my son create feelings of depression and then it made him think about and actually try to kill himself. It's all you fault!

Mr. Brown: (Settling his wife.) I'm sorry, my wife is still very upset about all of this. We are just concerned about the kind of assignments

that Greg is being asked to do and wonder if they are making him experience feelings that he never would have had. We feel that creative writing assignments are dangerous and should be taken out of the curriculum.

Mrs. Smith: I must defend myself and my beliefs in education. I gave this assignment with the best intentions and did not mean to harm anyone. If Greg wanted to tell me he was thinking about suicide, he would have made it more clear in the language of his poem. I believe that it is important to inspire my students to be creative. I truly felt that Greg was being very dramatic in his poem.14

In response to his case, students were asked to represent the viewpoint first of a member of the CORE team and then of Greg's parents. They were then asked to consider the effects of creative writing assignments on students with problems.

Taking the core team perspective, students generally found the teacher not culpable though with variations in assignment of responsibility for detecting possible emotional instability in a student. Defending the idea of creative writing, Shelly, a prospective English teacher, argued that creative assignments are much more motivating to students. However, she added that teachers should discuss with students the obligations of reading personal disclosures:

A teacher needs to make all his/her students aware of the fact that if they reveal personal information that shows they are somehow in danger, or being abused, that the teachers is legally obligated to report it. The students need to know that a teacher cannot hold everything in confidence. Then, when students do choose to reveal serious problems in their writing, this is a sign to he teacher that the student is blatantly asking for help.

Alice, a prospective elementary teacher, also absolved the teacher from guilt while acknowledging responsibility for the welfare of students:

After Greg's case, it is obvious that teachers need to be aware of the possibilities for this type of situation in their classrooms and to be much more cautious about similar situations....[But] I do not believe it is possible to be sure of a sign of this type of problem through only one sample of writing. There should be several samples available to look at over a period of time. If not, a child may be down in the dumps for one day and everyone thinks there is a problem....I think a journal would be a great thing to incorporate into this type of classroom. Have the students write about anything they want to in

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[14]Student authors acknowledged their indebtedness to the film "Dead Poets Society" and showed a clip in their presentation.

their journal every day. Then if you saw that the child was depressed in the journal and in the assignment, maybe you should contact the CORE team. They should definitely be contacted if this depression progresses.

Both these responses demonstrate that dealing with the problem led to a problem-solving approach in which the validity of more than one perspective was granted. Teachers should not be summarily prevented from giving creative writing assignments, which all prospective teachers valued, but arrangements should be made for acknowledging and if necessary acting upon the kind of personal information such assignments might reveal.

It was much more difficult for students to take the perspective of either of Greg's parents, whom they saw as over-reactive and perhaps too willing to blame the teacher for faults in their own relationship with their son. Many responses centered not on the perspective expressed by the parents in this scenario but rather on how the parents should have reacted. However, Denise, another prospective English teacher, did attempt to capture the parents' feelings and mount a persuasive argument on their behalf:

You can't blame us for being extremely upset about Greg's attempted suicide. You also can't blame us for being suspicious of Mrs. Smith and her creative writing assignment. Did she not think it odd that Greg's poem was the only one which assumed such a gloomy tone? The dark clouds which were depicted in the work obviously served as a catalyst for promoting Greg's darker thoughts. The extreme depression expressed by Greg should have triggered some kind of warning in Mrs. Smith's mind. Perhaps if she had approached Greg, or brought his poem to the attention of the school nurse or psychologist, he would not have attempted to take his own life. Creative writing assignments, which can force students to dwell on negative feelings, thoughts, and attitudes, can be extremely dangerous. If Mrs. Smith is going to make such assignments in the future, and we sincerely hope she won't, then she needs to be more aware of what her students are actually saying in their writing. Unfortunately, the development of such awareness is likely to require lengthy and expensive professional training -- something we cannot realistically expect of all our educators. Students these days have enough pressures and worries to contend with. We should constantly strive to accentuate the positive in their lives rather than asking them to write about gloomy, depressing topics. When students do express depressing, suicidal thoughts, it is the responsibility of the teacher to report it <u>immediately</u> -- at least as a precaution. Such an action may have saved Greg a great deal of turmoil.

Although one can easily think of more sophisticated and subtle twists to give this case, it demonstrates that pre-service teachers can convincingly project themselves into situations that experienced teachers would find daunting, and that

they understand that the boundaries of moral responsibility for teachers are by no means well defined. They are also capable of looking into the problematic aspects of generative teaching strategies and certain consequences implicit in current process writing approaches such as journal-keeping and creative writing. As the sampling of responses above show, some are using dialectical thinking to realize that effective solutions to complex problems cannot be found by individuals alone. The suggestions made for the teachers indicate the importance of involving several parties in the issue and making negotiation a primary strategy.

These and other serious issues were discovered and advanced by the students themselves in researching the topic which this case represents, imagination in learning. Working together on the task of creating a case with conflicting viewpoints, they explored the possibility of connections between imaginative and real acts and put themselves into the perspectives of the teacher who made the assignment, the other teachers who tried to understand its impact on a troubled boy, and the parents who nearly lost their son. Together, the inquiry and the collaboration enabled them to become a source of learning for themselves and their classmates in a way that an instructor or book could not have done.

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COLLABORATIVE LEARNING IN A TECHNICAL WRITING CLASS

Julie A. Held
Department of Supervision, IUPUI

Supervision 220: Technical Report Writing
24 students
Class room and computer laboratory

The first challenge to any teacher of technical writing is how to convince engineering and technology students of the value of the course. These students sometimes choose their field because they are attracted to programs that focus on activities other than reading and writing. Technology students, particularly, choose various technical fields - manufacturing technology, computer technology, electrical engineering technology - so they can learn how to do things not write things. In their minds, writing plays no role in their future profession. They enter my required course resistant and a little resentful because they "don't need it."

I am faced at the beginning of every semester with a two-fold challenge: how to convince these students of the importance of writing skills in their chosen profession and how to encourage them to learn these skills with the same enthusiasm they reserve for their technical courses. My greatest success to date has been a collaborative learning project.

The Project

The collaborative learning project makes up the students' first assignment of the semester and is generally introduced in the first class. The assignment is described as follows in the student syllabus:

> For this assignment, you will gather information on the communication tasks performed by two people in technical or managerial jobs. You will work with three or four other students in your class to prepare your report. Based on an interview questionnaire developed in class, each of you will interview two different people working in a job which interests you. You will write up the results of your interview and submit them to your group members. The final report will consist of a summary, which you will prepare collaboratively with your group members, followed by the individual reports submitted by each of the members and your questionnaires as attachments. Your report should be addressed to the Technical Communications Faculty, Department of Supervision. The faculty will use the findings from these reports to review the course design of TCM 220 and may prepare a report for the American Society for Engineering Education.

After they are divided into groups of approximately five members each, the students generally spend the first week during the class time allotted them

determining what questions they want answered. We talk as a class about general areas of interest to "prime the pump" and get them thinking. Once the groups have prepared a list of questions they would like answered, we combine those lists into a master list and then rephrase the questions so they can be answered with a yes or no, with a number or on a rating scale. The final product from this portion of the assignment is an objective questionnaire that all students use as the foundation for their interviews. In addition they are encouraged as a group to agree upon some open-ended questions to accompany the questionnaire.

Once the students have completed their interviews, they individually write brief reports summarizing the significant information obtained from the people they interviewed. These reports are then shared with other members of their group. Using these individual summaries, the students collaborate on the preparation of an executive summary which highlights the significant information gleaned from the individual reports. The final product turned in for a grade consists of an executive summary, the individual reports and an attachments section containing all the completed questionnaires. The entire project takes up about four weeks of the semester. I try to leave about 20 to 30 minutes at the end of each class for the groups to work on the project if that entire class has not already been devoted to the project.

The Response

I assign this activity in my classes with one primary and two secondary objectives in mind. The primary outcome is student recognition of the importance of technical writing skills in their chosen field. Of all my attempts over the years to convince the engineering and technology students that they must develop their writing skills, this project has ultimately had the most success, even more so than the practicing engineers who visited my classes as guest speakers. The students are consistently amazed at the response to such questions as "How important are good writing skills in your position?" They have discovered that engineers do not equivocate on this point: 90% of the responses indicate these skills are important or very important.

The first of my secondary goals involves the introduction of collaborative activity as a valuable part of the writing process. The results in this area have continued to delight me since I first introduced the assignment during the fall semester of 1990. Since the assignment is the first of the semester and the students begin working on it the second class period, they quickly develop a group identity. I have found that at times they even take on responsibility for teaching each other new concepts covered in class. For example, in one of the computerized sections I introduced a fairly complicated feature on Word Perfect. During the lab session, I often have to move from student to student to help them work through the laboratory exercise. One group, however, had developed such strong group cohesion, they actually refused my help, preferring instead to work out the exercise together in their "Assignment 1" group. They were empowered; they could do it without me. I found that response very exciting. At the same time, I notice that students will develop concern for the success of other members of their group. In some cases, that concern has survived the end of the course and even additional semesters. A few of the group members who happened to be in the same field of study, carried their collaborative activities over to their other technical classes, working together to prepare for exams or to solve laboratory problems. I often see

them together in the student study areas.

The last of my secondary goals for the assignment was content oriented. This assignment was designed to introduce the students to the concept of the two-part structure in technical reports and the process of summarizing information. Because they collaboratively write a summary which synthesizes the information from each of their individual reports, the concept of a preliminary or executive summary seems quite logical. I find that they are then able to transfer that logic to the remaining assignments of the semester when they have to write an executive summary for each of their remaining reports. In the past I have found this concept difficult to convey. Students have found it difficult to understand the necessity for the selected redundancy inherent in an executive summary.

Finally, the problems occurring with this assignment continue to be the same two problems I encounter with any collaborative activity I assign in my technical writing and technical presentation classes: 1) the group dynamics that occur when one student who prefers to work alone writes the collaborative portion of the project by himself or herself, and 2) the group dynamics which occur when some members of the group refuse to "carry their own weight." I haven't yet come up with satisfactory solutions for dealing with these problems. Despite these minor drawbacks, however, if this assignment does nothing more than accomplish my primary goal, it is, to me, a success. In the year and a half that I have been using this assignment, it has indeed accomplished that goal far more successfully than any other class activity I have tried.

WRITING AND GRADING GROUP ESSAYS

John F. Kremer
Psychology, IUPUI

Psychology : Abnormal Psychology
100 students
Availability of Computers

Two of the goals of this collaborative learning project are to help students apply what they earn to real-life behavior and to write about these insights. Another purpose was to develop a method to decrease the amount of time that a faculty member spends grading essays.

In this assignment students watched the movie "Ordinary People" and groups of 3-10 students wrote an essay analyzing the movie by applying the themes and ideas from the lecture. They were instructed to watch the movie with their group and write down their thoughts. Students then shared their insights with each other and developed an outline for the essay. A couple of students from the group wrote the essay and the other students critiqued and proofed the writing. The essay was typed on the computer and this completed half of the assignment.

For the other half of the assignment, students read and rated all of the group essays. To do this, they logged on the computer, selected the essay that they wanted to rate, read the essay, rated it on 4 dimensions, and gave written comments to the authors. The 4 dimensions were: quality of writing, number of connections between material in the class and the movie, creative insights into the film, and overall judgment of quality of the essay. (The computer program was developed by the instructor and Holly Stowe and Lena Woods from Computing Services.) By reading all essays, students could also think about the insights and applications of the other groups.

As I evaluated the essays, I developed a more precise rating scale. I actually counted the number of connections, insights, and writing errors that were presented in a given essay. I also gave bonuses for especially good connections, creative insights, and writing features.

The score for the essay was an average of the instructor's rating and the average of all students' ratings. I had a fear that students would not read the essays and would just give uniformly high or uniformly low marks. This potential problem was offset by giving students bonus points for doing a good job of rating. A good rating was determined by calculating the correlation of each student's score with a criterion group of students. The higher the correlation, the more bonus points the student received.

Many students liked the films and writing the essays. Students expressed only a couple of concerns: finding common meeting times and inconsistent student contributions. The latter problem was partially offset by allowing the leader to

award a 3 percentage of the total grade to each student. For example, the total maximum number of points for this project was 50, and the leader could decide that a student was contributing only 70% of what was expected and could award only 35 points.

STUDENTS EDIT MOVIES TO DEMONSTRATE EXAMPLES OF CLINICAL DIAGNOSIS

John F. Kremer
Psychology, IUPUI

Psychology: Abnormal Psychology
100 students
Work with VCR

In the Abnormal Psychology class, students often ask for good audio-visual examples of the diagnostic categories. To get examples for class and to help students apply what they know, students worked in small groups and identified a movie with a character that fit one of the diagnostic categories. They selected 5 minute segments of the movie to represent the diagnosis. Students also wrote a short essay describing the symptoms and relating the class material to the movie.

All groups showed their movie segments to the class. After viewing, students rated the segments on 4 dimensions: Audiovisual quality of the segments, ability of the segments to represent the diagnosis, creativity of the segments, and overall judgment of quality. All students filled out their evaluation on a computer sheet and these were taken to the computer center for scanning.

The score for the project was an average of the instructor's rating and the average of all students' ratings. I had a fear that students would not carefully evaluate the films and would just give uniformly high or uniformly low marks. This potential problem was offset by giving students bonus points for doing a good job of rating. A good rating was determined by calculating the correlation of each student's score with a criterion group of students. The higher the correlation, the more bonus points the student received.

Many students enjoyed selecting and editing the film. Students valued highly the work of other students. Some of the segments that students chose were remarkable and creative. Many of the movies had students captivated, even though the segments were only 5 minutes or less.

INTELLECTUAL COMMUNITY VIA TELECOMMUNICATIONS

Helen J. Schwartz
English, IUPUI

English
Small to medium classes
Lecture/discussion supplemented by telecommunications

Karin comes to class from her job in the Medical School. Vicki has problems every time her daycare arrangements must be changed; school holidays not observed at IUPUI call for special ingenuity. Marvin cannot attend a class outing because he works as a waiter on weekends. Myra will be out of town this week on a job-related trip. Ice storms and fog mean that students miss classes as buses run late and car troubles cause crises in mobility and financial liquidity. Students not only miss classes but find it difficult to schedule help sessions with instructors, access to on-campus computer clusters, or group study time or coordination on group projects. Without these staples of residential campuses, the multiple roles of urban commuters--as student, worker and family member--conflict and work against coherence rather than enriching their studies from their experience. The Twenty-First Century Citizen Scholars are students involved in a project to model a new kind of education for urban commuters:

--engaging students intellectually
--building community by integrating academic study and experience
--empowering students to learn actively and put their experience to work
--using the media of the 21st century to learn collaboratively.

A new pedagogy that fits the lives and schedules of the New Majority student is possible when classes use computers to communicate outside the classroom and to bring the world into the class. To ensure that a broad socio-economic spectrum is served, students in our pilot project are loaned any computer equipment needed to use electronic mail with access assured at a time and place convenient to each. As we have improved our ability to deliver and support such study logistically and as we have developed and now document its effectiveness, we are also exploring ways to make the project self-sustaining, incrementally expandable and adoptable on other urban commuter campuses.

Facts

Now completing its 4th semester of operation, the project has served nine classes, with over 90 students. With support services and materials in place, we have moved from teaching small classes (10 students maximum) to a medium-sized class in Spring 1991 semester.

The project's philosophy has been implemented with a wide variety of classes:
--introductory classes that fulfill general education requirements

(G104 - Language Awareness)

--lower division classes that attract majors and non-majors (204 Introduction to Non-Fiction Prose)

--experimental courses (S200 American Ethnic Minorities; W411 Directed Study in Research Methods; and a study group with the Vice Chancellor for Undergraduate Education)

--upper-division major courses (Anthropology 460--Anthropological Field Methods; G310 Sociolinguistics)

--graduate courses (W510 Computers and Writing)

Four teachers have volunteered from different academic fields (Linguistics, Literature, Writing, Sociology and Anthropology), and other faculty have expressed interest in joining the project.

A team approach guides planning and implementation, including faculty and students, administrators, computer support personnel, and vendor support.

--Team21 includes the Project Director (Professor Helen Schwartz) and the Project Manager (student Teresa Hollowell) as well as student consultants largely recruited from former project students.

--Administrators, faculty and students have already presented or been invited to present their findings in 18 talks at 14 conferences (local, national and international)

--Faculty and students in a research group (W411) have analyzed project data for assessment and modification of plans.

Financial support has been broad-based:

--from an IBM Joint Development Grant (21 computers and technical support)

--funding from J. Herman Blake, Vice Chancellor of Undergraduate Education, and matching funds from William Plater, IUPUI Executive Vice Chancellor

--from Computing Services (computers, funding for consultants, support personnel)

--from an NET faculty grant and an IUPUI Assessment Grant
--from the School of Liberal Arts and the Department of English

Accomplishments

Pedagogical philosophy + computer access --> intellectual benefits
Communicating by computer provides a valuable adjunct to the classroom.

From their homes, students can dial up the mainframe computer on campus at any hour and send electronic mail to an individual or to a class "bulletin board" on which all classmembers can post and read messages. Telecommunications is necessary to provide the means, but the 21CCS philosophy informs the pedagogy and model for bulletin board use. Students are seen as bringing assets of experience and commitment to the learning process, rather than deficits that must be filled up or compensated for. Initial analysis of data suggests the following benefits are achieved (with selections from one class in Appendix B as illustration):

1. The teacher models the etiquette of the bulletin board, welcoming and supporting students as they succeed in logging on, showing that comments about extracurricular interests and activities are welcome and making assignments that require participation.

2. On the bulletin board, students can put forth ideas that might seem digressions in class but that explore new ideas and personal experience leading to new, broader syntheses and intellectual coherence. The social warmth of the bulletin board (though many find the medium cold) helps students overcome the intimidation of the technology. Having established solidarity and comfort with each other, students (and faculty) have the chance to modify or add to class discussion after additional thought; they can comment on assignments before class discussion, sometimes calling for clarification or help. To illustrate, consider the following exchange from a 300-level linguistics class, "Social Speech Patterns," in which 10 students and their teacher met once a week face-to-face. One student, Gillian (all names except the teacher's have been changed), raised questions about the linguistic effect of pep rallies.

> #244, GillianV, Sun, 14 Oct 90 10:35
> . . . I would like to share something with everyone. On Friday, at North Central, they had a pep rally. The sponsor [Gillian's supervising teacher] - who is from England - sat near me also. She said that students from Korea and Vietnam probably could not identify with what was going on at - they would probably have a lot of questions. She said that they would never have been able to express themselves like the students were - yelling clapping for themselves (ie. senior class etc), and reciting poems such as, "kill the Patriots...stomp them out!" I found it interesting because she used the term "barbaric" to explain what she felt about the rally. She also stated that in England - which is more similar to the United States than the Asian countries - they would never be allowed, or really have the desire, to behave in such a manner. She questioned the principal'sdecision in letting the students recite such elicit [sic] poems. I told her they were not to be taken literally, they simply performed a motivating function. My question, what do you all think about such gatherings, and what do you think the linguistic actions of the students accomplish? I'm interested in reading your replies. Time to go, see you later! G

The pep rally occurred on Friday, Oct. 12, two days after the once-a-week Wednesday night class. About an hour after Gillian posted her reflections, Marty responded:

#245, MartyF, Sun, 14 Oct 90 11:38
Gillian,

In many cases, the school system uses competition to socialize children to develope western ethnocentricity, and American idology in particular. The competitive spirit is a segregating phenomenon that prepares young people to adopt the assembly line thinking of the west that evolved after the Industral Revolution. We do not question what the group adopts,do we.Rather, if we take a stand that is opposite from the group decision, we are considered out of the norm. The teem players and the peripheral sub-groups (ie the cheerleaders, peo-club, bandand etc.) is a hierarchal structure that gives the message:"If you are good enough, work very hard, you will be a star. But that is not true. There is politics involved in every aspect of our lives. High School sports is non-professional, but it is the highest ranking money maker for individual schools. That is why provate schools recruit inner city boys (who can't read) and give them scholarhips. I don't know much about the English school system, but I understand that their soccor game's are violent. The acculturation of foreign students is a motivating function for them to negate their own beliefs in the face of the technological world. They are learning to become good Americans so that they can recieve some of the concessions that are alloted "good, hardworking-Americans." Ask their grandparents what they think of American high school pep sessions. I always enjoyed them.--Ha! M

We can see thought in action here. Marilyn Cooper and Cynthia Selfe comment about exchanges on a similar supplemental bulletin board used in an advanced undergraduate course in technical writing (in "Computer Conferences and Learning: Authority, Resistance, and Internally Persuasive Discourse," College English 52 [1990]: 847-869). They argue that the bulletin board helps students develop strategies of resistance (in an attempt to change the status quo, in contrast to opposition which refuses to engage) learning how to use "internally persuasive discourse." Such discourse is defined by Bakhtin as "half-ours and half-someone else's. Its creativity and productiveness consist precisely in the fact that such a word awakens new and independent words, that it organizes masses of our words from within, and does not remain in an isolated and static condition" (as quoted in Cooper and Selfe 859).

In her posting, Gillian reports another person's comment and then she questions this idea in a generalized form appropriate to class content. Marty seems to be trying out different ideas as she writes (on-line). Her opinion sounds like a general adaptation of a Marxian line, but she questions as she goes, asking whether there isn't violence in English soccor and then thinking about asking for the perspective of foreign-born grandparents. The ending is pure, honest reaction--admitting she always liked them and adding a playful and enigmatic "Ha!"

The teacher responds to previous messages (around 6 p.m. on that Sunday) and adds the idea of programmed enthusiasm as a device for enforcing groupthink. A Cuban-born student, Santina, then adds two notes near midnight on Sunday: the

first assuring Gillian that foreign students she has worked with do find pep rallies odd. She adds, "I can remember my first pep rally and I remember thinking it was kind of loud, however, Latins are known for 'loudness'. I went to Ladywood High School (Cathedral now) and there were about ten of us Latins in the school. We could get rather roudy at times so I don't know why I would think a rally was loud. Funny, huh?" (#250, SantinaM, Sun, 14 Oct 90 23:14). She sends another note (#251 at 23:40) responding to the teacher's comments with a reference to Fidel Castro's speeches and then applying the remark to the contemporary war with Iraq: "I believe there is a little or maybe a lot of chanting being done in Iraq and its allies right now."

We see here that what Cooper and Selfe call strategies of resistance "become a powerful, generalizable heuristic for them. Students become much more likely to question their own opinions as well as the information featured in the course and to learn how knowledge develops when different opinions and ideas come into contact" (857).

3. The teacher's requirement to post assignments on the bulletin board insures that all students will participate. Students have the opportunity to speak regardless of their shyness or lack of quickness in response, unlike class discussion. But some students choose to keep a low profile. Requiring students to post assignments not only ensures everyone will be able to attend, but also avoids alienation between frequent contributors and those who prefer to read only ("lurk"). Unlike group work in class, however, the variation in time of posting assignments gives weaker students the opportunity to see the work of others as a model before posting their own.

4. As the semester progresses, the teacher participates proportionately less and students take on many of her initial functions as they become active, empowered learners--asking whether silent students need help and calling for participation, setting topics for classroom discussion, putting forth hypotheses, suggesting outside activities (attending a poetry workshop, attending a March on Hunger, recruiting disabled students into 21CCS classes). In contrast to class, interchange on the Bulletin Board is more student-centered and more student-directed. Initial analysis of videotapes of the class (including both a discussion and a session featuring student reports) shows students initiating almost 3 times as much on the BBoard as in class.

5. The Bulletin Board is a supportive place, like a coffeehouse of the airwaves. Pointed criticism or evaluation is almost completely absent from the Bulletin Board although it is conveyed in class, in comments on student papers and in private e-mail messages. Instead, the Bulletin Board contains messages of encouragement or suggested help. Intellectual friendship led to mutual help--with tenant problems (loss of heat and leaking ceilings), and with a puppy needing a home as well as sharing of books and information. Sharing their lives as whole human beings contributed to class-related discussions, for example, the social context of speech acts in a discussion of high school pep rallies in L310, Social Speech Patterns; or the subject matter of poetry with relation to a nurse's reactions to a baby's death (in L115, Literature for Today); or narration of terrorism in Beirut from a student's experience shared with S200, American Ethnic Minorities.

6. Intellectual coherence and depth develops when the class includes student experience outside the classroom and experts "join" the class from afar. Students and faculty naturally mentioned their life and concerns outside the class, sharing the birth of a first child, an engagement (with subsequent visit by the fiance to class), illness and triumph. Family members joined in, with one student's sister corresponding with another student's son, and the boy's mother joining the discussion on Christian feminism at several points in the semester. In the graduate class on computers and writing, experts from Stanford University, the University of Michigan and Purdue University (including the editor of our textbook) counseled students and joined the discussion as peers. A class on using electronic mail in teaching writing, a short course for high-school teachers at the University of Edinburgh, asked for our help as respondents.

7. Faculty noted an increased involvement with their students and with each other as they logged their reactions and counseled each other on a Team21 bulletin board for 21CCS staff. Faculty who got to know their students as whole people felt an increasing belief in the "asset" theory of education. Faculty built trust among themselves, often reversing the role of mentor and mentee between tenured and untenured faculty and with faculty nominating each other and students for awards and grants.

8. Students felt empowered because they worked and learned with each other, with faculty and staff. Student input has been essential on Team21, on initiatives and suggestions to change the program (include disabled students, work on project participation beyond one semester), in staffing (program manager, computer consultants) and evaluating (program manager's study on videotape and research group as well as input on questionnaires).

9. Students become familiar with advanced technology useful in their academic disciplines and useful in employment. All students master electronic mail and word processing, with some students continuing as consultants. And computer availability in some classes allowed all students to do more realistic work in their major--collecting and processing data in Ethnographic Field Research (Anthropology 460), sharing data in Sociolinguistics (English G310) and working with computer programs in Computers and Writing (English W510).

Plans to Expand and Institutionalize

1. Arranging for longer association with the project will increase the project's impact on learning. Instead of limiting student participation to one semester (for most students), we will build an option to continue through work with the project or community-based work.

2. The modular nature of the project allows expansion in increments of 20 computers. The student-centered nature of the project allows easy adaptation to different student groups and college settings.

3. Community support and input is needed to institutionalize the program by providing sites for student service and by supporting computer purchase and loan.

Partners in business, government, education and community service are needed to advise us on outreach and service.

Appendix A: Team21 Papers, presentations and proposals

As part of our on-going development and evaluation efforts, the following papers, presentations and proposals have been developed or are underway:

World Conference on Computers and Composition, Sydney, July 1990: "The Social Context of Networked Learning: Computers as Medium," by Helen J. Schwartz and Kristin Froehlke; also presented at the Indiana College English Association, Purdue University, October 1990 and invited talk, Teaching Conference '90: Collaborative Learning in Higher Education, October 12, 1990, IU-Bloomington

*with Mary Sauer and Anne Williams. "Computers in the Writing Classroom: Pros and Cons," Indiana Teachers of Writing, Indianapolis, Sept. 1990

Workshop demonstration invited, National Testing Network in Writing, New York, November 1990: "Collaboration through Computer Networks" by Helen J. Schwartz

"Toward Defining a New Rhetoric of Computer-Mediated Communication," Midwest Modern Language Association, Kansas City, Nov. 1, 1990; also presented at IU-B conference on Science, Literature and Interdisciplinarity, invited, February 1991; and at the Interdisciplinary Seminar, English Department, Purdue University, West Lafayette, February 1991

Panel accepted, National Council of Teachers of Writing, Atlanta, November 1990: "Writing across the Community and the World with Computer Networks," including presentations
--"Scholars for the 21st Century: Outreach for the New Majority," by Helen J. Schwartz
--"Correspondence for Competence," by Pamela Takayoshi (based on W510 research project)
--"Outreach in Teacher Training" by Susan Blackwell (based on W510 research project)

Paper presentation solicited, Modern Language Association, December 1990: "Pricing Literacy: The Ethics of Access," by Helen J. Schwartz

Paper in preparation, "Creating a Community of Learners in an Urban University," by Lynn Robertson and J. Herman Blake

Panel presentation, Conference on College Composition and Communication, Boston, March 1991: "Writing to Learn and to Act: Electronic Mail for Twenty-First Century Scholars," including presentations
--"The Twenty-First Century Scholars Project: Electronic Mail for the Urban Commuter Learner" by Helen Schwartz
--"Planned and Unplanned Discourse for Critical Thinking" by Susan C. Shepherd

--"Writing for Action: Texts for an Activist Learning Community" by Lynn Robertson (based on work as project manager and in research group)

"Building Community with Computers for the Urban Commuter Student," invited presentation, IBM Academic Computing conference, June 1991, Helen Schwartz

"Equity of Access: Pricing and Financing Literacy," juried presentation, EDUCOM Conference, San Diego, October 18, 1991, Helen Schwartz.

IUPUI accepted to host national Computers and Writing Conference 1992, in preparation by Helen Schwartz and Mary Sauer

Appendix B: Selections from a TCCS Bulletin Board

To give some idea of the interchange on a class electronic Bulletin Board in the 21st Century Citizen Scholars project, one strand that developed in a one-month period has been chosen for summary and presentation from the G310 class (Sociolinguistics). Each note is identified by the number of its appearance on the Board, its speaker (with a fictitious name), the day, date and time (by a 24-hour clock) of the message:

#138, GillianV, Sun, 30 Sep 90 12:10 EST
[At the end of a short note citing problems logging on, Gillian mentions an apparently irrelevant and transient piece of personal information:] Today I am going to try to make black bean soup for my husband - it is supposed to have curry flavor, I'll let you know how it tastes! See you all in class. GillianV

#139, SusanS [teacher], Sun, 30 Sep 14:24
[After explaining the logon problem, the teacher closes:] I think Gillian should bring us all balack bean soup for dinner Wed. night [the time of the class]! SusanS

#140, ValB, Sun, 30 Sep 90 17:30
Gillian--We only want black bean soup if it ends up being good. ... ValB

[Discussion progresses to comments on different cultural variations of black bean soup from:
#142, SantinaM, Sun, 30 Sep 90 22:29 -- "a traditional Cuban dish, except that it is just called black beans and you eat it over a bed of white rice. They are delicious! I also had some Saturday night which my mother had made.... Santina

#143, MartyF, Mon, 1 Oct 90 7:02
You know I just love this class and the opportunity to interact with different cultures. We call black bean soup. Black beans and rice, Or red beans and rice. Another name for curried rice is "dirty rice" because of its'grayish-green color.... Gillian you have guts. Santina, you are so interesting. Marty

#145, SusanS, Mon, 1 Oct 90 13:19
In Antigua "dirty rice" or seasoned rice is rice and beans, usually with chicken backs and necks. Cooked without rice, some kinds of beans are called "stew(ed) pea(s)". Red bean are often cooked with cow heel, which makes them very gluey. They taste much better than they sound! SusanS

#146, GillianV, Mon, 1 Oct 90 17:00 [reports soup is bland though husband ate it. Asks for recipe]

#147, SantinaM, Mon, 1 Oct 90 20:49 [says to soak overnight, use a pressure cooker, and gives tips about ingredients from mother's recipe.]

#148, GillianV, Mon, 1 Oct 90 21:56 [thanks for recipe]

#150, ValS, Mon, 1 Oct 90 23:58 [gives recipe for "fast and easy" red beans.] Hey, maybe we could write a cookbook--"The Linguistic Gourmet"--what do you think? Chow (so to speak) everyone!

#151, MartyF, Tue, 2 Oct 90 9:26 [Lack of soaking produces flatulence. Childhood poem included]

#152, MartyF, Tue, 2 Oct 90 9:31 [in response to #146, Marty code-switches to Black English from Standard English]: THey's one thang white folk got ta learn. Yaw got ta add seasanin to ya cookin! Save all ya bacin grease and add it to ya beans. Best thang in the worl. Marty

#155, SantinaM, Tue, 2 Oct 90 22:18 [response to #152]: Marty, your language is so interesting that I have started to save it under your own file.... You sure have a way with words....

#156, SusanS, Wed, 3 Oct 90 9:18
Gillian -- Can you believe what your simple comment about cooking dinner generated? Maybe ValS is right-that we should start our own cookbook. By the way Marty, SOME white folks know something about seasoning! Your'e talking to someone who grew up in a family where even popcorn was popped in bacon grease!...

#157, MartyF, Wed, 3 Oct 90 14:35 [response to #156 on bacon grease]

#158, MartyF, Wed, 3 Oct 90 14:37 [to #155]: Santina, I am privileged and flattered. Marty

#164, MartyF, Thu, 4 Oct 90 18:44 [asking for data on what class members call their mothers, Marty proclaims:] We will make this topic our linguistic rescipe for the week....
[This use of the recipe idea as a motif results in responses with data from several students:
#166, SantinaM, Thu, 4 Oct 90 22:19 [called mother "mami"] --> #170, MartyF, Fri, 5 Oct 90 2:25: "tells me thaT you; are a traditionalist Latin American. I am pround to know you." --> #177, SantinaM, Fri, 5 Oct 90 22:48 [shares background leaving Cuba to "get away from Castro and his ideology" and mentions she doesn't like "the word 'Hispanic'. It makes me think of the picture we often see of a lazy Mexican sleeping under a huge hat." --> #188, SusanS, Sat, 6 Oct 90 :26: "Santina--I'm not surprised that you dislike the term Hispanic, but I'm surprised at your reason! I think in many academic discussions, it's assumed that all Spanish-speaking AMericans (or immigrants) have similar cultural backgrounds, which is far from the truth! Similarly, we tend to lump all Native Americans together...."
#177-->#195, MartyF, Sun, 7 Oct 90 12:51: "SANTINA, ... Some African Americans have a problem with the title 'Black, so I do empathize with your problem. I have a problem with the

word Ghetoo because it reminds me of a prison or consentration camp. Now that I think of it, that is what most of poor housing is--prison, because living in the projects can become ones' personal hell. Marty" --> #232, AlineR, 9 Oct 90 23:23 [starts a new discussion on her dislike of the way the word "holocaust" is used]

#178, ValB, Fri, 55 Oct 90 23:34: "... Marty, I call my mom "Mom". Sorry but I'm boring middle class all the way. That's why all of you are so interesting to me. I've traveled a lot but it would be nice to see things from a different point of view occasionally.

#179, SusanS, Fri, 5 Oct 90 23:38 [asks what Marty's kids call her, adds data from her family and analysis of power relations with titles] --> #199, MartyF, Sun, 7 Oct 90 13:34 [tells what her kids call her]

#234, JillL, Tue, 9 Oct 90 23:44 [what she calls her mother and what she would like to be called if she had kids]

#193, BarbaraM, Sat, 6 Oct 90 16:41 [calls mother "mother"]

#168, AlineR, Thu, 4 Oct 90 23:32 [to stories and recipes, Aline adds a story about her step-grandfather bringing "Gumbu" spices from New Orleans to Champaign, IL]

#184, ValS, Sat, 6 Oct 90 :09 EST [In speculating on how Grice's laws of conversation relate to the examples students posted on the Bulletin Board, ValS uses the motif]: anybody want to wager a bean soup recipe on this to make it a little more exciting?...

[The motif of bean soup becomes a shared term and an appeal to solidarity and response in the group.]

#242, SantinaM, Sat 13 Oct 90 9:34: "What is this silence from everyone? Not even recipes this week! Hope everyone has a nice weekend! Santina [starts a conversation on pep rallies and different cultural responses]

#383, SantinaM, Mon, 22 Oct 90 18:17 "... I've read some pretty interesting e-mail this week. I also liked our recipe week, right Gillian? Santina" --> #396, GillianV, Mon, 22 Oct 90 22:04 [after a week in which ValB discusses linguistic problem she has with peers when she has temporary authority to discipline them and ValS starts a strand on mechanical voices, gender and power, Gillian responds:] Santina: You're right, recipe week was a great week. I don't know if I can intellectually keep up with the em-ail group this week! I'm afraid that I can't write my ideas so eloquently. Keep up the good work gang - it makes for wonderful reading material!! ValS - would you give us a sample of one of your poems via e-mail? Copyright protected of course!"

[In the following weeks, poems follow from ValS, MartyF and ValB, plus appreciative, non-critical responses from other class members.]

COLLABORATIVE LEARNING VIA STUDY GROUPS AND THE ELECTRONIC CLASSROOM

Robert Althauser
Sociology, IUB

Sociology 317: Sociology of Work
25 - 100 students
Lecture hall; rooms with movable desks

The Course

I have been teaching a Sociology of Work class for almost seven years. This is a 300 level course that draws mostly general Arts and Sciences majors. About 1/3 are business students or pre-business students; around 10-15% are majors.

Class sizes have ranged from 110 to 25. The classes germane to this discussion are in progress (N = 110, 40) or were taught in the spring (N=58) and fall (N=25) of 1991. The fall 1991 course was an 'intensive writing" course. The first spring of 1991 class (N=58) was held in a lecture hall seating 150; the fall writing course in a smaller classroom hold 44 seats. (From comparing seating capacity with the much smaller enrollments in each case, you can see that there was room for students to move into groups and talk comfortably to each other).

This course helps fulfill distribution requirements for business and arts and sciences students. It is not otherwise required.

Collaborative Work

The activities entailing collaboration include membership in a regular study group which

1) works together during class 'group work', usually discussions preceding full class discussions
2) meets out of class, face-to-face, preparing for exams
3) contributes, individually, to an electronic classroom (EC hereafter) bulletin board, to which classmates can respond.

Formation of Study Group

In the first course, study groups were organized by students themselves; typically people sitting near each other early in the course. In the second course, I assigned people to groups, partly based on seating proximity. I have stressed the value of diversity in group composition but find this theoretical notion has little effect on how groups form; prior acquaintance or physical proximity determine group formation.

What is the EC

The "EC" is organized simply, into a series of instructor created topics, 1.0, 2.0, 33.0, etc and student and instructor generated 'replies' to various topics, numbered 1.1, 1.2, 33.12, etc. Imagine a 'rides wanted' posting on a student union bulletin board, with topics "Eastbound", "Southbound" etc and people wanting and

offering rides posting cards underneath, and you have the idea. Continuing the analogy, the "student union" (university computer system) never closes (according to its schedule; though sometimes it 'crashes'), so students and faculty can log on anytime and add their commentary. 'Conversation' is not 'real time'; but people enjoy reading other people's notes and responding when they can. At Bloomington, the EC uses VAXNOTES software, loaded on our five Colorful Vaxes.

Working on Test Questions; the Tests Described

The primary activity driving group work, both face-to-face and on the EC, is their work on a set of 20 previewed exam questions handed out one week in advance of each exam date. The exam students take one week later includes these 20 questions plus questions worth an additional 30 points. My exams use multiple-choice, true-false and matching questions, and also very short answer questions. Under the influence of Phil Sanders, now chair of Economics at IU-B and a master at creating interesting and challenging objective test questions, I have especially stressed questions which apply concepts or entail 'comprehension'. I try to use 'recall' questions to 'set up' higher leveling questioning, though not exclusively. I do not believe in teaching writing by having student write essays on recall questions under time pressures, whatever the contingencies of grading them with large enrollments are. I am indebted to Bonnie Kendall (Anthropology - Bloomington campus) for the idea of using previewed test questions).

These previewed questions illustrate all the different formats of questions on the actual exam and which include most of the challenging questions. If I plan on using a matching format for example, I will list five concepts to be applied but only one alternative example as a preview question. So the set of questions indirectly serves as a study guide, along with earlier handouts of study questions on most readings.

Groups at Work

Groups typically meet to compare ideas about questions before they individually enter their projected answers on the electronic bulletin board. To provide incentives beyond the obvious advantage already accruing to such meetings, individual students are assigned to insert answers on one-half of the 20 questions in the EC. Beyond this 'minimum requirement', students are also assigned bonus points if their group additionally replies to other group's answers to questions, thereby offering statements of agreement with an answer for the same or for different reasons, or disagreement. (Some of these comments are priceless). I have treated these bonus points both as part of the course requirements and as 'extra-credit' points. In the latter form, the affect student's individual grades without affecting the 'curve', e.g, the correspondence between test scores and letter grades. As part of course requirements, they affect the curve as well.

Grading Group, Individual Work

The formula for awarding these bonus points runs something like this:

Bonus = Number of replies * proportion of group meeting individual minimums in initial answers * proportion of study group to log in at least one reply * a measure of the average quality of their initial answers to questions. This product is capped at some maximum number (e.g., 10) for a given exam.

Students therefore see the advantage of rallying their fellow study group

members to participate and provide good answers.

The quality of individual students work is assessed as follows. I grade 20 % of a student's answers or 2 of their 10 answers). I make sure that the questions chosen for grading are comparable in difficulty, based on the observed percentage of correct answers for each question. I also look for questions that discriminate between students rather than questions which over 85% of students answer correctly. Out of the five points awarded for each of these questions, I assign

2 points for familiarity with material
2 points for reasoning about the answer
1 point for having a 'correct' answer.

Students are informed about how individual answers and group work bonus points are awarded ahead of time.

Rationale

One of the themes of this course is the contrast between the 'management model' of control-oriented managers in an era of industrial organization marked by mass-production and large scale economies and the emerging segment of the workplace that stresses increasing workers' skill, knowledge and self-management and a redefines management's role. The last day of the course is devoted to a discussion designed to make completely obvious the parallels between the old and new workplace and passive-learning, large lecture courses versus active learning collaborative structures. Perhaps more than ANY course I could imagine being taught, the materials presented in the course encompasses the very forms and types of 'work' and 'production' it structures in the classroom!

Reactions

1. Many students (especially in the first course) drop the class because EC participation is a requirement for passing the class. (I was warned that participation would be half-hearted at best if I didn't require it). (They also switch out because a project is required: they must arrange to site visit and interview an employee in a work organization of their choice and to write up a project report according to a stated format.) The result, however, is a more self-selected group of students who are more prone to accept and even embrace the requirement. The fall semester's crop, already self-selected by dint of the intensive writing involved, had no problem diving into the computer system. Part of the reason, however, was that I marched them down to a bank of computers during class time on the first Friday of the week and trained enough of them myself to persuade the rest that this could and would work. Of course, those who learned first showed the rest how.

2. Some students report some gratitude for having been exposed to computers; others cling to announced prejudices against them. With growing literacy and with increased usage of word processing packages and PC clusters, computer-phobia is no longer a consideration.

Benefits

1. One of the most enticing benefits of this arrangement is that I can experiment with test questions I would hesitate to use, sight-unseen, on exams. Because students SHOW THEIR WORK on these questions in the EC, I can detect any

difficulties with the question and made slight but crucial changes in wording (alerting them to that fact) on the actual test.

2. The most exciting benefit, however, is that I can see how students understand or fail to understand course materials, how they succeed or fail in reasoning their way toward answers. (I watch with anticipation as the answers to questions begin to appear in the EC. Even more interesting are the moments when student tell other students they are wrong, giving reasons why!). What they grasp or fail to grasp is far more transparent to me than before, prompting changes in how I approach the same material the next time.

3. Finally, the entire experience makes me more accessible to the whole class via electronic mail. If I receive an inquiry that all should read, I can post my reply for all to see in the EC, as well as send a mail copy to the individual student. While computer communications are portrayed as impersonal and distant, my experience (and that reported by faculty in a national bulletin board I receive mail from) suggests quite the opposite. The opportunity to easily communicate with their instructors, expressing thoughts and even feelings they would be reluctant to display 'face-to-face', opens up students in surprising ways, not unlike the quiet students who become expansive in journal writing. "Impersonal technology" actually makes learning for some students far more personal than before. This happens between students, sometimes leading to hilarious inquiries between newly found computer buddies like "which one are you in class?" At the same time, the additional e-mail traffic has not been a problem.

Problems

1. Perhaps the most interesting problems relate to the size of groups working in the EC and to the posting of answers. In the spring 1991 class, study groups of 3-4 were combined into clusters of 3 study groups. Five clusters then worked separately on the same exam questions, segregating their work from other clusters but sharing the work across study groups within the cluster. In hindsight, this worked better than the fall arrangement, where all 25 students shared a single workspace when inserting answers. Here the 'problem' was a 'serial correlation' or a tendency toward a 'response set' in answers to a given question. Long runs of the same answer to a given question would occasionally be broken up by dissenting students bravely asserting another answer. This would set off a new run of answers agreeing with the second and challenging the first. Some of this was a direct result of group's having met separately and deciding on a different answer before logging on. As in any collaborative effort, however, collective mistakes can be made. Sometimes they are caught; sometimes they are not. The trick is to structure as much collision of answers which are independently developed as possible.

2. In both EC classes, students were required to log on once a week even during weeks when no exam was coming up. The first class was permitted great choice in the topics they responded to. Most replied to a free-floating 'informal coffeehouse' topic, but many complained that this was not a serious enough reason for requiring weekly participation, despite other, less attended topics growing out of the course materials, speakers and films. The intensive writing class was naturally led to insert weekly short writings on announced topics during non-test weeks. The EC proved an efficient means of having students comment on other student's writing; and of allowing me an easy way to insert comments in student

text and return the combination to them on e-mail.

3. However, increasing difficulty in logging on, day or night, has forced me to discontinue using the EC in two sections of this same course during the current spring 1992 semester. The problems in this respect became quite apparent in the fall of 1991; fortunately my class then was small (25). During the spring of 1992, I am continuing to use study groups and am awarding extra-credit bonus points for work on previewed questions, but no use of the EC is involved. Instead, study groups justify their answers to questions by filling out 5 x 8 cards, one question per card. Working with cards rather than EC entries is far more time-consuming and inefficient than any comparable use of the EC. Most important, the vital feature that students in the EC can view and respond to each other's work is absent. I expect to discontinue this aspect of collaborative learning in large sections of future classes, if inadequate funding levels and internal allocation of money leaves the EC practically out of reach.

Non-problems

1. In case this account has raised concerns about using previewed test questions, following Bonnie Kendall I also require them to justify answers to some of these to discourage free-riding, e.g., group members reaching for 'right answers' without understanding. I rely more on the remaining previously unseen questions than Prof. Kendall. I believe she hands out her entire set of questions before hand. When I give the exams, however, students cannot refer to any materials, including marked up copies of the previewed questions. I also change the lettering and order of multiple choice and matching alternatives to discourage memorizing of answers from previewed materials.

In Sum

I have happily altered my approach to both undergraduate and graduate teaching as I embrace what I understand to be the principles and practice of collaborative learning. Not discussed above was my experience using the EC in a graduate course (spring 1991), primarily as a place to post weekly papers and to secure printouts of same prior to a class discussion, but secondarily as a place of post-class discussion and debate, even to the point of drawing in the commentary of other faculty colleages! Unhappily, inadequate allocation of funding and inadequate funding per se has adversely affected both telephone access to the Vaxes and the user capacities of the Vaxes, discouraging any further utilization of the EC in the near future. Alternative approaches using cards are vastly inferior.

COLLABORATIVE LEARNING IN AN ELECTRONIC CLASSROOM

Daniel R. Sharpless
HPER, IUB

Recreation & Park Administration 337: Computers in Parks and Recreation
40 students in two sections (20 each)
Minicomputer terminal lab MW, microcomputer lab TR, and seminar room R.

Information

This paper concerns collaborative learning activities in R337 Computers in Parks and Recreation, a course offered by the IUB School of Health, Physical Education and Recreation. Students are mostly juniors and seniors. Enrollment in each section is limited to twenty. Two sections of the course are offered in the fall, winter, and first summer sessions. The fall and winter offerings are taught in an intensive (eight weeks) format. The summer session is six weeks in length. Approximately half of the class sessions is held in a computer laboratory. The course is a requirement for students majoring in recreation, sports and tourism management.

An electronic classroom is defined as a course-specific computing environment designed to enhance communication among students and their instructor. Some of the computer applications common to an electronic classroom are electronic mail, electronic bulletin board and computer-assisted instruction.

Collaborative Learning Activities

This course is designed to introduce students to computer applications being used in their field. Students who have already acquired all of the skills covered may be exempted from the course, however, many of the people in the course are familiar with one or more (but not all) of the applications. The utilization of skills possessed by these class members is one of the strategies used in the course. Another strategy involves creation of a non-threatening classroom environment, a major challenge in a computer cluster. These and other teaching methods employed in the course are designed to encourage the students to continue to use computers after the course is over.

Unlike most computer courses, R337 focuses on the computer as a communication tool rather than as a calculator. Electronic bulletin boards, electronic mail, word processing, and graphics are the focus of the course. Collaborative learning fits into this setting much better than one might expect.

Students in the course are grouped by majors. Within groups, students are paired so that beginners are placed with students who have already developed some computer skills. Experienced students are encouraged to help their partners with lab work.

Class activities include preparing and posting the following on the class bulletin board:

1. a self-introduction
2. a personal resume
3. proposed examination questions
4. a summary of an outside reading
5. a report on an interview with a practitioner in their field

Other activities include establishing and operating a second bulletin board for students interested in the field, discussing topics in the learning groups prior to class discussions, organizing study groups for course exams and using the Collaborative Work Laboratory for development of recommendations for course improvement.

Students are encouraged to collaborate on their work and share their knowledge and resources with their classmates. They are urged to examine the self-introductions and resumes posted to the class bulletin board for ideas they might want to incorporated into their own document in the future. The outside reading is a partnership project with the work shared by the couple. Unlike the typical written report, other members of the class may read the reports, thereby spreading the benefits of the effort. The posting of proposed test questions serves to encourage participation in the study groups.

The students enjoy the opportunities to interact and learn from one another. Initially, they are uncomfortable with the amount of work they are asked to do, which carries no credit or grade. Also, many are reluctant to depend on the computer as a source of information. Overall, they are pleased with the changes from the normal class routine and they are delighted with the new skills they are developing.

Problems encountered with this approach to course work include the following:

1. assessing work for grading purposes
2. dealing with the occasional student who would rather work and study alone
3. inding good resource material on collaborative learning and the electronic classroom

Solutions include the instructor and the students accepting the idea that not all course activity must be graded. The students get sufficient (perhaps better) motivation from the knowledge that their work is going to be read by classmates and people outside the class who "windowshop" through the class bulletin board. The would-be loner is somewhat appeased by the knowledge that examinations are individual efforts.

One out of every ten class meetings is set aside for group work. Group meetings outside of the class are up to the members. No effort has been made by the instructor to monitor these outside sessions but there are indications that pre-exam study sessions are held.

During the second eight weeks of their R337 semester, many of the students are enrolled in another course which makes use of electronic mail and an electronic bulletin board in conjunction with collaborative learning projects. The instructor for

that course, Dr. Ruth Russell, is currently on sabbatical leave in Malaysia and is not available for preparation of a joint paper.

Conclusion

The collaborative learning activities used in R337 have been of considerable value in the learning process. The students are learning more and learning in a context that will enable them to make better use of the knowledge in the future. I am continuing to search for other ideas on how to make the class members feel more a part of the learning process.

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